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Charlatans in Iron Metallurgy

Modern and Historic Nostrums—Thomas Process
Once a Fake—Chlorides and Iodides in
Puddling—Patents

BY HENRY D. HIBBARD*

BEFORE chemistry was used to control iron metallurgy (used in its broadest sense), and even after it was quite generally so used, but before it so completely dominated the art as now, there came into notice a continuous succession of men who, often unfamiliar with the subject, advocated certain methods, procedures or nostrums relating to iron or steel as having great influence in improving or cheapening the product.

The first of these were probably pre-historic. In ancient but historic times they included the advocates of the use of goat's urine, or the living flesh and blood of a "Nubian of fair form" for quenching heated steel, particularly a sword blade, to give it the proper temper. Their number since then has been beyond computation. For every good sound practicable idea probably ten worthless ones have been advanced.

Some of these men might be classed as charlatans or, to use the more modern term, "fakes;" others were indeed sincere, believing in their ignorance that their claims were founded on truth and fact. But the fakes were knowingly impostors, trusting to their cleverness and verbosity to make some profit out of their worthless ideas.

It is curious and not devoid of interest to note how some of them jumped at conclusions which now seem absurd but for which they had what may have appeared to them sound, or at least plausible, foundations.

It therefore excites no wonder that, when a man came along with something truly meritorious but novel, he had a hard time in getting even a hearing because he would naturally be classed with the swarm of impostors and others who had gone before, some of whom may have been successful enough to have cost the iron trade, or some of its followers, money. The iron-masters who had had that experience could hardly be blamed for refusing to listen to, and much less to carry out, ideas which, judging from previous results, probably called for expense without return.

Early Days of the Thomas Process

When Sidney G. Thomas, the inventor of the basic process for making steel, announced at a meeting of

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the Iron and Steel Institute in 1878 that he had a process for eliminating phosphorus from iron in the Bessemer converter his remarks were treated almost universally with indifference or derision. When he presented a paper on the subject to that institute in Paris later in the same year, it was not read, though it was printed and circulated.

There were a few, however, among those present who saw something in it and we can take satisfaction in the fact that Holley, an American, not only saw merit in Thomas' ideas but did something toward developing them by recommending them to the attention of G. W. Maynard, another American then in England, who gave them a trial and who has written some account thereof. Indeed, when Maynard told Thomas that he believed he (Thomas) "had it," meaning the removal of phosphorus from iron in converting it into steel, the latter, with tears in his eyes, said that those were the first encouraging words anyone had given him.

Salt in Puddling Iron

It had long been known, perhaps from shortly after the time that the method of puddling iron on a basic, that is, an ore lining, was introduced by Rogers early in the past century, that common salt (chloride of sodium) was a beneficial agent in the puddling operation. We know now that its good effect was produced by the sodium and not the chlorine.

The salt, or that portion of it which was not immediately volatilized by the heat, was changed to oxide of sodium or soda, which combined with silica in the cinder, forming the easily fusible silicate of soda, increasing the basicity of the cinder and also its fluidity by lowering its fusion point. The more basic cinder favored the elimination of phosphorus from the iron, while the lower fusion point resulted in a cleaner separation of the slag from the iron when the bloom was worked by squeezer, hammer or rolls.

As a result of this good effect of salt certain persons, thinking evidently that to the chlorine was due the credit of the improvement in the quality of the iron, assumed that, if that element were beneficial, others of the halogens might be even more so, and

HERE we have the story of some of the "cure-alls," ancient and modern, for the ills of steel and iron metallurgy, recounted by one qualified to do the telling. Among these, the following take rank as the more prominent:

Salt as a benefit to puddled iron.

The "Sherman" or iodine process for steel and iron—once seriously discussed by British and French metallurgists.

Nitrate of soda for puddled iron, and bone black for crucible steel.

Patents, good and bad.

The story of the Thomas steel process—once pronounced a fake by prominent metallurgists.

based so-called "processes" thereon. Of the other three halogens, iodine and fluorine have had their advocates who loudly proclaimed them as cure-alls not only for iron but for steel as well. Whether or not anyone ever took up bromine the writer does not know, but it is quite likely that someone did.

The "Sherman" or Iodine Process

The advocate of iodine was one Sherman, whom I have heard described as a man of good address. He certainly succeeded in attracting attention to his "process," which consisted merely in throwing a little discolored iodide of potassium into a puddling furnace or Siemens-Martin steel furnace. In a few seconds it of course all went up the stack.

It is amusing to read the serious references to the "Sherman Process" in the technical press of 50 years ago and the discussions thereon by such a conservative body as the Iron and Steel Institute. Sherman obtained patents for his process and his vogue endured for several years in France, where he had stanch advocates and supporters. In this country the method was tried at the Norway Iron & Steel Works, South Boston, Mass., but of course with negative results.

Fluorine in Early Days

The use of fluorine was taken up by one Henderson who claimed that it would eliminate phosphorus in large proportions from iron; enough so that any pig would be suitable for making steel. It was before the basic process had been invented and the requirements for dephosphorizing iron were known but dimly by any—by most, not at all. So his plan for doing it was ostensibly as good as or better than any other.

He introduced fluorine into the bath, in puddling and open-hearth steel furnaces, in the form of fluoride of calcium (fluorspar). Though his claims were for the most part unfounded, the use of the spar has survived, partly because of some desulphurizing action it has on the metal, but chiefly for the fluidity it imparts to basic slags deficient in acids and hence too infusible and needing a flux.

Nitrate of Soda in Puddling

In 1869 Heaton proposed and tried to make superior wrought iron from what was then considered inferior pig iron by adding niter (nitrate of sodium) to the charge in the puddling furnace. Whether he based his hopes on the oxygen or the soda in the reagent he did not say. Both were known to play a part in iron metallurgy. Some of his results were quite encouraging and point to the soda in making the slag basic as the beneficial ingredient, some phosphorus having left the metal and entered the slag.

Half a century ago certain parties advocated the addition of "codorus" or "silicon" ore to the charge in puddling, the only effect of which, as Howe pointed out, was to increase the volume of slag. Holley described it in the following Limerick:

There was an old man of Codorus,
Who said he'd take out the phosphorus,
So the iron he puddled,
And with chemicals muddled,
But the puddling took out the phosphorus.

Bone Black in Crucible Steel

Within a few years a New York man has advocated the addition of bone black to the crucible steel charge. He evidently reasoned that, if ground bones were good for carburizing steel by cementation, as in case-hardening or face-hardening armor, they would be good to add in melting. A little knowledge of steel metallurgy would have told him that if phosphate of lime, which forms a large part of bones, were to be melted in a crucible with a steel charge having an acid slag, the phosphorus would all enter the steel and ruin it.

The claim that the iron in a certain ore is better than that in some other ore borders on charlatany and has only in recent years been discontinued. Iron is one element and only one. And there is only one chemistry of iron as of any other element. Any variation

between two pieces of iron which have had the same treatment is due solely to the non-ferrous ingredients contained.

Direct Processes

An attractive but probably hopeless field of effort is the production of steel from iron ore by a "direct" process. Many able men from Siemens down have tried it unsuccessfully, foiled usually by the non-ferrous constituents of the materials they employed. The late James C. Bayles, in considering a direct process 40 years ago, acknowledged what a fine thing a workable direct process would be; but he added that, under certain conditions, "which might exist in one's mind, for instance," a direct process might succeed. But the ores, fuels and fluxes in the earth are as one finds them and are not ideal or suitable for this purpose. With an ample supply of ore containing 99 or even 98 per cent of iron oxide one might succeed with a direct process.

Patents Goods and Bad

The patent lists show a great number of mixtures for improving or cheapening iron or steel as well as many processes and methods which have never got into use. Some of these were based on sound principles metallurgically, but gained no place for divers reasons. Many could and should have been detected as impracticable, from knowledge of the requirements of successful practice. Other things held to be of value in the art were kept as secrets.

Some of these patented or secret nostrums aim to improve the quality of cheap, ordinary steels so as to make them as good as the best. Others are for making burnt steel good again. In both cases the betterment is claimed to be accomplished without re-melting, an operation which any well-posted steel worker knows to be indispensable in such cases.

Over 40 years ago the writer was asked to watch and record results from the use of a certain physic in puddling iron, of which the formula was:

	Lb.
Black oxide of manganese.....	6
German plumbago	10
Sulphate of iron.....	4
Sulphate of zinc	6
Sal ammoniac	4
Common salt	200
Total	230

The directions for using it were:

"1½ lb. to a charge of 500 lb. of iron. Add after metal is melted and is as hot as possible. Then work with damper down with smoky flame."

This mixture when added made copious fumes but the results from a number of heats were not such as to warrant the continuance of the practice; they were mostly negative. The salt alone would probably have given better results than the whole physic.

When something new metallurgically either in material or method is tried, the furnace men instinctively feel that it is they and their work which are under trial. Sometimes therefore the new process or ingredient is credited with improvement which is due partly or wholly to better efforts of the workmen.

In one experimental charge of puddled iron, which came to my notice, the muck bar obtained weighed considerably more than the pig iron charged. After the observers had departed my informant demanded of the puddler how it happened and the latter, with a grin, admitted that he, while poking his fire, had introduced a piece of scrap cast iron weighing about 25 lb. through the fire and over the bridge wall into the charge in the working chamber. He did not want to be blamed for a small yield.

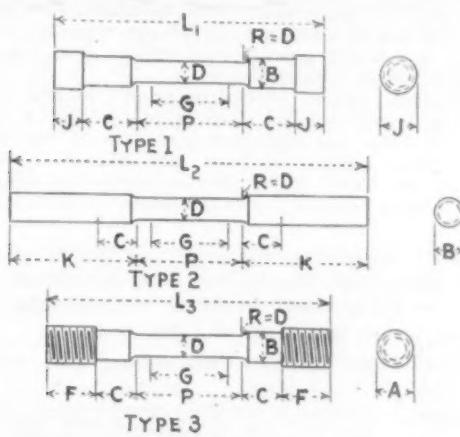
Even today the charlatan or dreamer sometimes gets a hearing. Some iron and steel masters, not feeling sure that an amateur or at least one inexperienced in iron or steel metallurgy may not beat science, a not unknown occurrence, are willing to try an experiment that is not manifestly hopeless, if the claimant contributes his time for it without compensation.

Testing Metals for Aircraft*

New Proposed Standard Specifications and Methods for Testing Light Alloys

BY N. S. OTEY

WITH the foregoing discussion as a basis, proposed standard specimens and methods of testing aircraft metals are offered which, it is believed, will meet the immediate needs of the industry. These are put in specification form for the sake of simplicity and usefulness and, where possible, accepted practice and text have been used. Points of differentia-



All Dimensions in Inches				
Size	1	2	3	4
Size of stock.....	% up	% to %	% to %	% to %
A U. S. or S. A. El. threads...	%	%	%	%
B Shoulder diameter \pm 2%	0.600	0.450	0.290	0.150
C $\pm \frac{1}{2}$ in.	%	%	%	%
D Gage diameter \pm 2%	0.500	0.375	0.250	0.125
F Approximate	1	%	%	%
G Gage length \pm 0.002....	2.000	1.500	1.000	0.500
J Approximate	%	%	%	%
K Approximate	3 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$
L ₁ Approximate	6	4%	3	1 $\frac{1}{2}$
L ₂ Approximate	9 $\frac{1}{2}$	7 $\frac{1}{2}$	6 $\frac{1}{2}$	3 $\frac{1}{2}$
L ₃ Approximate	6 $\frac{1}{2}$	4%	3 $\frac{1}{2}$	2
P Parallel length	3	2 $\frac{1}{4}$	1 $\frac{1}{2}$	%

Plate 1—All Specimens Shall Be Tapered in Diameter Toward the Center of Gage Section by an Amount Not Greater Than 1 Per Cent of Gage Diameter; When Testing Type 2 Specimens, the Ends of Gripping Jaws Shall Not Approach the Gage Portion of Specimen by an Amount Less Than Dimension (C) as Shown

tion are noted which will facilitate criticism and aid in any revisions found desirable.

General

1.—These specifications shall form part of all individual specifications except where specific differences occur, in which cases the individual specifications shall govern.

Sampling and Chemical Analysis

2.—The manufacturer shall furnish chemical analyses of all materials offered where the composition is specified. The methods of analysis shall be those agreed upon between the purchaser and manufacturer.

3.—In general, samples of materials for chemical analysis shall be taken as follows:

(a) Material 1.5 in. or less in diameter or thickness shall be sampled through or across the entire section. For larger sections the sample shall be taken over an area whose central axis coincides with a line parallel to the axis of the piece and midway between

*Second half of an article published in THE IRON AGE, Dec. 17, page 1660. The author is engineer of tests at the Naval Aircraft Factory, Philadelphia.

its center and surface, simulating the locations shown on Plate 4. In the case of irregular shaped pieces, a composite sample shall be taken from the thickest and thinnest sections.

(b) Samples may be taken from broken test specimens.

(c) Samples shall not be less than 2 oz. unless otherwise agreed upon between manufacturer and purchaser. They shall be clean and free from dust, oxide or extraneous matter. All sampling shall be done with slow-speed tools and surface cuttings shall be discarded.

4.—In case segregation is suspected, a sample from any point may be analyzed. The percentage of any element of this sample shall not deviate by more than 10 per cent of the amount specified.

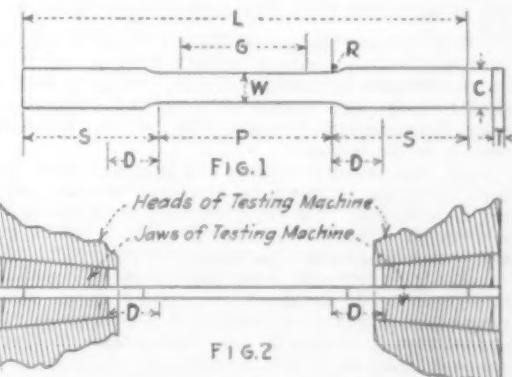
5.—If unsoundness or piping is suspected, samples may be nicked and broken and the fracture examined.

6.—Materials may be examined microscopically and shall not show sufficient porosity, slag, dirt or other defects to make them undesirable.

Preparation of Test Specimens

Tensile Specimens:

7.—The axis of test specimens from worked metals such as bars, billets, forgings, etc., shall be located as



Dimension	Sheet Thickness	
	1/4 in. and less	1/2 to 1/4 in. incl.
G Gage length ..	2 in.	4 in.
L Minimum	9.75 in.	11.75 in.
P Minimum	3.00 in.	5.00 in.
C Maximum	0.750 in.	1.125 in.
D Minimum	0.875 in.	1.125 in.
R Approximate	0.5 in.	0.5 in.
S Approximate	3.0 in.	3.0 in.
W	1/2 in. \pm 0.010 in.	1/4 in. \pm 0.015 in.
T	Thickness of Sheet	

Plate 2—Specimens Shall Be Reduced in Width (W) at Center of Gage Length (by Draw-Filing) Not More Than 0.004 Inch When (W) Equals 1/2 Inch and 0.006 Inch When (W) Equals 1/4 Inch; the Distance (D) Between End of Gripping Jaws and the Shoulder of Specimen Shall Not Be Less Than the Gage Width (W). In testing thin sheet metal the tendency to tear and break near the shoulders can be reduced by making (C) not greater than 1.13 times (W)

shown on Plate 4. The transverse axis of specimens from sheets or plates shall be located as near the center of the sheet or plate as practicable.

8.—Round bars under 1/4 in. in diameter may be tested without machining. Bars which are not round

(hexagonal, square, etc.) and are under $\frac{3}{4}$ in. in thickness may be machined to the largest round possible and tested. In testing specimens of this type the elongation shall, in all cases, be measured over a gage length equal to 4 times the diameter. The acceptance of data from these tests as representative of the material shall be optional with purchaser.

Note.—These specimens are intended for preliminary inspection tests where the importance of the material does not justify using specimens of the form shown on Plate 1. This practice is not advised, however, for testing metals of low ductility, such as castings, etc.

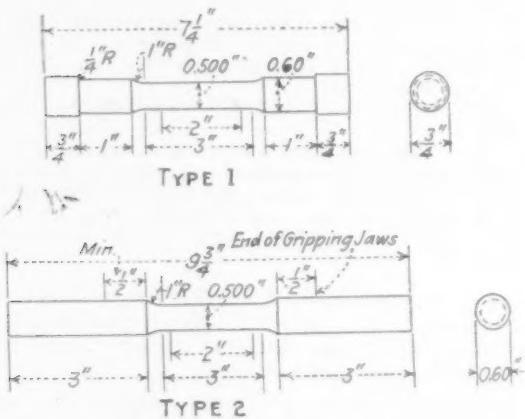


Plate 3—Specimens, Types 1 and 2, to Be Tapered in Diameter From 0.510 In. at the Ends of Gage Portion to 0.500 In. at the Center of Gage Portion; Specimens to Be Cast to Above Dimensions and Tested Without Machining

9.—Standard specimens from bars, billets, forgings, etc., shall conform to dimensions shown on Plate 1, the form indicated by types 1, 2 or 3 being optional with the manufacturer except for hard or brittle metals, in which cases either type 1 or 3 shall be used.

Note.—These specimens deviate from S.A.E. and current Federal standards in the following respects:

(a) Greater latitude is here granted as to methods used for attaching specimens to testing machine. In some specifications, however, this is left to the discretion of the engineer.

(b) The parallel lengths and shoulder radii have been increased to minimize abnormal stresses within the gage length. Further advantage is taken of this increase in parallel length by the way in which gage marks are staggered; see paragraph 24.

(c) The different types and sizes of specimens have been made geometrically similar in all dimensions which affect the properties of the material. This necessitated a change in one thread size of type 3 specimen from the S.A.E. standard $\frac{1}{2}$ in. to $\frac{5}{16}$ in.

(d) As suggested, a limit has been placed on the location of gripping jaws with respect to gage portion of type 2 specimens. This is intended to standardize the effects of gripping jaws on the deformation of the specimen within the gage length.

10.—Specimens from plates, sheets and shapes shall conform to dimensions shown on Plate 2. Where coupons have been cut by shearing, the material to be removed from each edge of the gage portion of speci-

men shall be not less than the thickness of sheet or plate.

Note.—(a) Here again the parallel lengths have been increased and limits set for gripping jaws as noted in paragraph 9.

(b) Machining the edges of sheared specimens is intended to remove the material that is severely cold worked in the shearing operation.

11. (A)—Specimens shown on Plate 3 shall be used for cast, low shrinkage, non-ferrous metals such as aluminum, magnesium and their alloys. When these specimens are not attached to the articles they represent, they shall be cast as shown in Fig. 1 of Plate 9.

Note.—(a) These specimens correspond to those on Plate 1 except that the shoulder radius has been increased to reduce the tendency to break at this point.

(b) Type 1 specimen of Plate 3 is preferred to type 2 because of the difficulty in applying an axial load to the latter.

(c) Most data compiled from these castings have been obtained from unmachined specimens and, since the skin effects (chilled surface) are considerable, it is not considered advisable to change this practice without further investigation.

(d) The method of casting shown in Fig. 1 of Plate 9 is recommended since, in the process of casting, the metal has an opportunity to wash the mold and produce sounder castings. The location of gates, runners and risers is such that shrinkage and temperature effects are practically the same for each specimen.

11. (B)—Specimens for cast, high shrinkage alloys, such as manganese bronze, etc., shall be cast as shown in Fig. 2 of Plate 9 and machined to dimensions shown for types 1 or 3 specimens of Plate 1.

Note.—These specimens and methods of casting

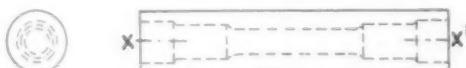


Fig. 1

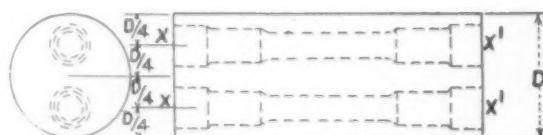
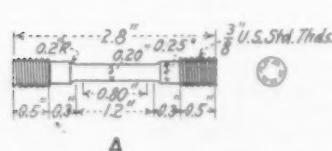


Fig. 2

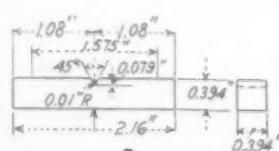
Plate 4—In This, Fig. 1 Applies to Bars 1½ In. and Less in Diameter or Thickness. Fig. 2 Applies to Bars Greater Than 1½ In. in Diameter or Thickness. Axes $x-x'$ Are Parallel to the Direction of Rolling

represent standard practice and any changes should be preceded by exhaustive investigation.

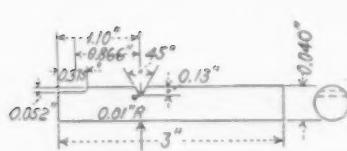
12.—Specimens from tubing shall be prepared for test in full section up to the capacity of the largest testing machine available. Where the strength of the full section tube exceeds the capacity of the largest



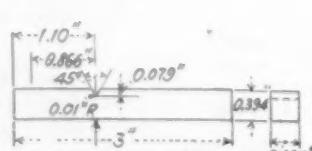
A



B



C



D

Plate 5—A Represents the Charpy and Izod Bar for Tension; B, the Charpy for Transverse; C, the Izod for Transverse; and D, Another Izod for Transverse Tests

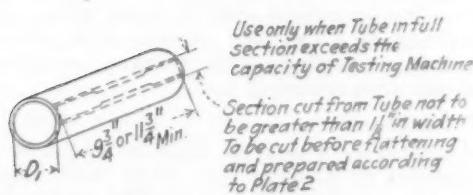
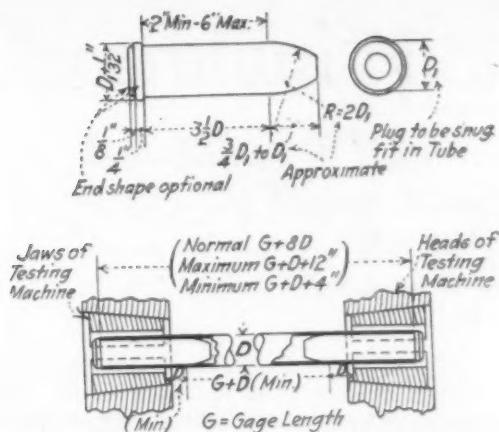


Plate 6—Various Types of Tests for Different Sizes of Tubing

testing machine available, specimens shall be prepared as shown in Fig. 3 of Plate 6.

Bend Specimens:

13.—Bend specimens from sheets and shapes shall conform to dimensions shown on Plate 8. Their edges may be rounded to the radius shown, in which cases the edges shall be finished by drawfiling parallel to the longitudinal axis of the specimen.

Note.—Much controversy has been expressed as to what constitutes a longitudinal or transverse bend. The definitions shown on Plate 8 are determined by the direction of the longitudinal axis of the specimen with respect to the direction of rolling or working of the sheet in process of manufacture.

14. (A)—Crushing or flattening specimens for tubes, used to disclose seams or flaws, shall be of the full cross-section of the material and shall have a length equal to 1.5 times the nominal outside diameter ± 0.015 in. Their ends shall be machined normal to the longitudinal axis of the tube.

14. (B)—Crushing specimens for tubes, used for strength tests, shall be of the full section of the material and shall have a length equal to 15 times the nominal wall thickness. Their ends shall be machined normal to the longitudinal axis of the tube.

Impact Specimens:

15.—Impact specimens shall conform to dimensions shown on Plate 5. The faces of rectangular specimens shall be plane and parallel. The base of the notch must be of uniform depth and normal to the longitudinal axis of the specimen. Notches may be milled or ground but shall be finished by lapping.

Note.—(a) The impact tensile specimen shown on Plate 5 has been made geometrically similar to those of Plate 1 and of such a size that for most materials rupture can be produced in an impact machine of 120 ft.-lb. capacity.

(b) The impact bend specimens are fairly well standardized but the type of notch used varies considerably. In order to establish some basis for comparison between the Izod and Charpy tests, the notches have here been made the same.

Physical Properties and Tests

Testing Machines:

16.—Testing machines shall be in good working condition, and calibration evidence shall be furnished as to their accuracy and sensitivity. Tension and compression machines shall be accurate within ± 0.30 per cent of any registered load and shall be sensitive to 0.01 per cent of their maximum capacity when fully loaded.

Note.—(a) The above accuracy requirements should apply only over a range of loading for which a particular machine is adaptable. A recommended range is between the limits of 5 per cent of the maximum capacity and 100 per cent of the maximum capacity. For example, a machine of 100,000 lb. capacity would be required to have an accuracy within ± 0.30 per cent of any registered load over a load range of 5000 to 100,000 lb. Such a machine would not be considered suitable for loads below 5000 lb. unless the loads were applied very slowly and extreme care taken in maintaining beam balance.

(b) The sensitivity value given would require that the beam of a 100,000 lb. capacity machine show perceptible movement if a weight of 10 lb. were placed on the weighing table with machine under full load.

Test Grips for Tensile Tests:

17.—The grips used for tensile tests shall provide axial alignment and even gripping of specimen.

Tubing Tests:

18.—Tubing shall be tested in full section up to the capacity of the largest testing machine available. Where tubing is tested in full section, the plugs shown in Fig. 1 and the "Set-up" shown in Fig. 2 of Plate 6 shall be used. Tubing that exceeds the capacity of the largest testing machine available shall be prepared as shown in Fig. 3 of Plate 6 and tested in the same manner as specimens from sheet metals.

Note.—The writer is not aware of any standard specimens or methods of testing tubing. Although this is a problem of major importance, the engineering information available is very meager. On Plate 9 an attempt has been made to standardize average accepted practice.

Stress (P/SI):

19.—The term stress used in these specifications shall be interpreted as the load in pounds divided by the original cross sectional area in square inches. It may be indicated by the abbreviation P/SI.

Proportional Limit (P.L.-P/SI):

20.—The proportional limit is the stress at which deformation ceases to be directly proportional to the load. It shall be determined from a stress/strain (load/deformation) curve as the first prominent point of inflection in the curve. The deformation readings for plotting this curve shall be taken with an extensometer which will measure 0.0001 in. unit deforma-

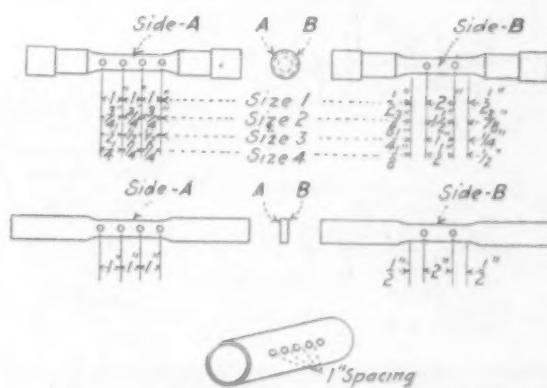


Plate 7—Stagger Method for Laying Out Gage Marks in Determining Elongation

tion of the specimen. The extensometer shall be attached to the specimen at the gage points.

Note.—The reader is referred to the annual report of A.S.T.M., Committee E-1, 1925, for a broader review and suggestions of methods for making this determination.

Yield Point (Y.P.-P/SI):

21.—The yield point is the stress at which marked increase in the deformation of the specimen occurs without marked increase in load. For determining the yield point one observer, with a pair of dividers, watches for visible elongation between gage marks on the specimen. When visible elongation is observed, it is reported to the machine operator who records the load at that instant as indicating the yield point. An

Plate 8—When the Direction of Rolling or Drawing Is Along the ($x - x'$) Axis of the Bend Specimen the Test Shall Be Called Longitudinal Bending. When the direction of rolling or drawing is along the ($y - y'$) axis of the bend specimen the test shall be called transverse bending. Where strip stock is less than 6 in. in width, the length of specimens for transverse bending shall be equal to the width of the strip.

elongation not greater than 0.01 in. over a 2-in. gage length shall be considered visible. In case an extensometer is used for proof test, a unit deformation given by the formula shall be regarded as indicating the yield point.

Formula :

Where e = unit deformation
 S = specified yield stress, P/SI
 E = modulus of elasticity, P/SI

Ultimate Tensile Stress (Ult. T -P/SI) :

22.—The ultimate tensile stress is the maximum stress required in breaking a specimen, as indicated by beam readings on the testing machine.

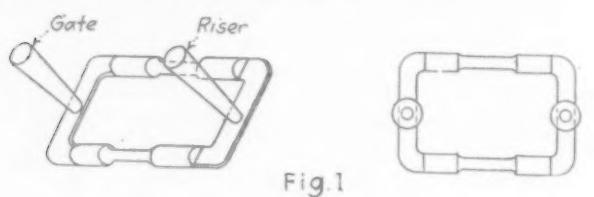


Fig. 1

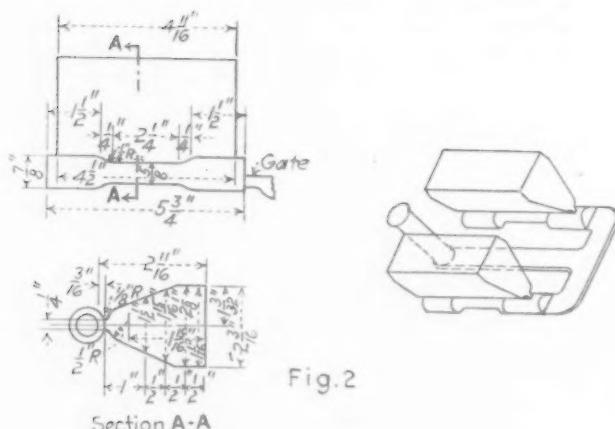


Fig.2

Plate 9—Methods of Casting High Shrinkage Alloy Tests. Dimensions for machining are given in Plate 1.

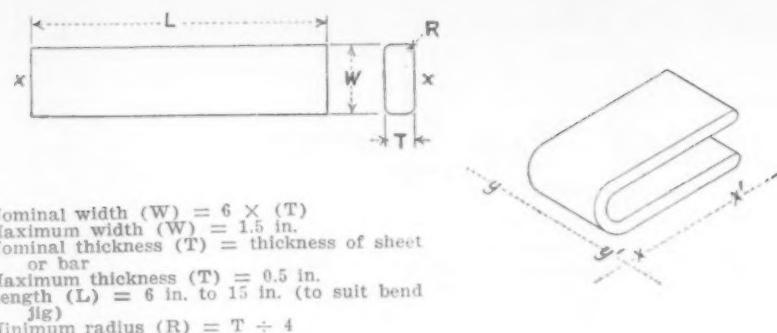
Elevation:

Elongation: 23.—The elongation is the percentage difference in length between gage marks before being subjected to any stress and after rupture. The stagger method shown on Plate 7 shall be used for laying out gage marks.

Note.—This is intended to afford a means of measuring elongation over that portion of the specimen which has undergone greatest deformation. This method of gage marking has been used at the Naval Aircraft Factory for more than three years with satisfaction. No mathematical corrections are applied to determinations.

Reduction of Area:

24.—The reduction of area is the percentage difference between the area of the gage section before being subjected to any stress and after rupture. The



latter area shall be measured at the point of greatest reduction.

Crush Tests:

25.—Crushing tests shall be made with a load applied gradually. The load shall be axial and may be applied with a testing machine, having auxiliary bearing blocks with spherical seat.

Bend Tests:

26.—Bend tests shall be made by means of a bending machine or forming jig. They shall be made in such a way as to insure free bending of the specimen and hammering over the radius shall not be permitted. Surfaces may be lubricated if desired.

Note.—A bending machine such as shown on Plate 10 has been found satisfactory for testing duralumin sheet.

Hardness Tests.

27.—The methods described in A. S. T. M. reports of Committee E-1 on methods of testing, presented at the annual meetings June, 1924, and June, 1925, shall be used for Brinell hardness testing where diameter of ball impression, under standard load, is measured. Where applicable the Rockwell hardness test is recommended. In testing thin sheet metals for hardness by means of a scleroscope, the specimen shall be backed by an auxiliary anvil of the same material as that of the specimen. This anvil shall be at least 0.125 in. thick.

It is hoped that these proposed standards will stimulate discussion from those interested in this work, as considerable advantage will be gained if standards can be established on a fundamental basis before the art has developed to an extent where practice and custom have a major influence. Credit is due the Bausch Machine Tool Co. for design of bending machine shown in Plate 10. Acknowledgment is made to the manager of the Naval Aircraft Factory for encouraging this work and its publication. Very helpful suggestions and criticisms are acknowledged from members of the Bureau of Standards, Army Air Service, Aluminum Co. of America, Bell Telephone Laboratories, Inc., and others interested in this work.

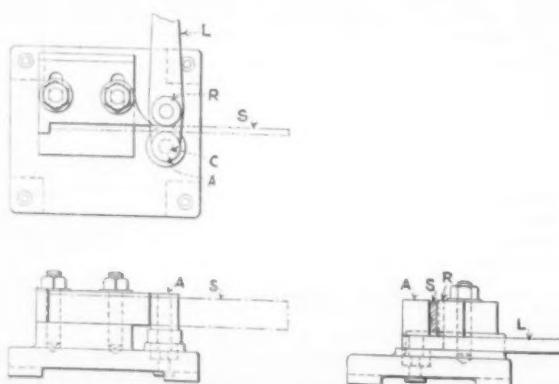


Plate 10—Design for Bending Machine. The specimen S is bent with the lever L which swivels about point C, carrying roller R. Pins A and rollers R are furnished in various diameters to suit thickness of specimens.

Chromium-Nickel Electric Ingots

Manufacture in Basic-Lined Arc Furnaces—Preparation of Molten Metal—Thermal Efficiency—Essentials to Soundness

BY J. H. HRUSKA*

THE rapid increase in the amount of carbon and alloy steels produced in basic-lined electric arc furnaces has resulted in the ability of a basic hearth not only to remove phosphorus and sulphur but especially to eliminate or at least minimize the presence of non-metallic inclosures, oxides and dissolved or occluded gases (N₂, CO, O₂, H₂, etc.) more completely than in any other melting or refining furnace. Thus the inherent adaptability of the modern electrometallurgical processes assures, in this way, a sounder steel for forging or rolling purposes than can be produced in the older furnaces.

In the operation of an electric steel plant, however, methods should be used which will result in a thorough

	Per Cent	Per Cent	
Carbon	0.40—0.45	Sulphur	0.010 max.
Manganese	0.50	Nickel	2.50
Silicon	0.15	Chromium	1.00
Phosphorus	0.015 max.		

Charge used in making the heat:

	Lb.
Turnings	5,300
Scrap (aver. 2.62 per cent Ni)	6,350
Ferronickel (25.7 per cent Ni)	472
Nickel (96.7 per cent Ni)	7
Metal	12,129
Lime	145

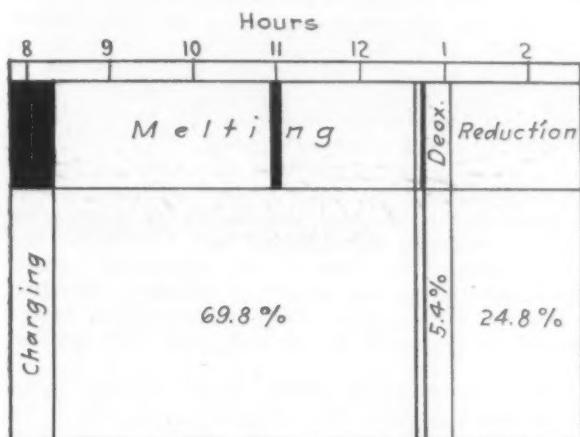


Fig. 1 (Left)—Distribution of Heat Supplied by the Electric Current in Making Alloy Steel in a 7-Ton Héroult Electric Furnace

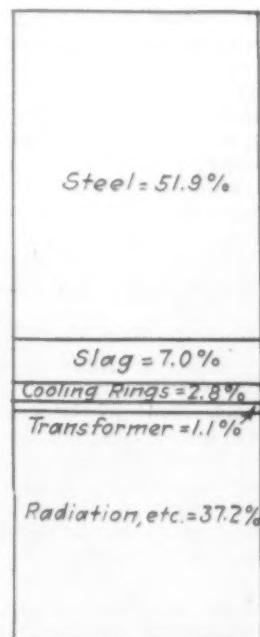


Fig. 2 (Right)—Heat Distribution per One Ton of Nickel - Chromium Steel in Basic Electric Furnace

knowledge of all the factors which may improve the quality of the produced steel. The determination of the influence of the many governing factors on the chemical and mechanical properties as well as on the uniformity of the product may be most conveniently ascertained by making empirical logs of various heats and instantaneous chemical or heat balance sheets. When this has been done, a comparison of the obtained results on a uniform commercial basis gives the easiest method for any definite decision or useful change in the previous practice.

In this paper an effort has been made to show by one of these complete records and balance sheets a satisfactory practice in the manufacture of high-grade nickel-chromium steel for an approximate 5 tons weight of ingot.

Preparation of the Molten Metal

The following outline designates the characteristics of the furnace used, the operation of the heat and the amount of materials added and produced:

Furnace : 7-ton Héroult arc furnace.

Arc : 3 carbon electrodes 16 in. in diameter.

Hearth : magnesite of an analysis averaging as follows:

	Per Cent		Per Cent
Si O ₂	1.18	Ca O	2.26
Fe O	5.44	Mg O	89.12
Al ₂ O ₃	0.60	Ign. loss	1.33

Specification to which the metal is to be made:

*Metallurgist, International Harvester Co., McCormick Works, Chicago.

Time	Operation	Length of Operation
7.48	Charging	
8.20	Current on	32 min.
10.57	Electrode No. 2 broke; replaced	
11.02	Current on	
11.28	94 lb. lime added	
12.01	No. 1 samples of steel and slag taken	
12.40	Furnace tilted to skim off the oxidizing slag	Melting: 4 hr. 20 min.
12.43	Current off and remaining slag removed	
12.45	Slagging finished; current on	Slagging: 5 min.
	After slagging added:	
	22 lb. lime	
	15 lb. fluorspar	
	140 lb. carburite	
	3 min. later.	
	35 lb. ferrosilicon	
	40 lb. ferrosilicomanganese	
	55 lb. lime	
1.03	38 lb. lime added	
1.05	5 shovels powdered ferrosilicon over slag mixture	
1.13	No. 2 samples taken, after the bath was thoroughly stirred	
1.16	4 shovels powdered ferrosilicon thrown on slag	
1.25	No. 3 samples taken	
1.30	30 lb. lime added	
1.36	3 shovels powdered ferrosilicon	
1.44	No. 4 samples taken	
1.48	No. 5 samples taken	
	Added:	
	172 lb. ferrochromium	
	60 lb. lime	
	4 shovels powdered ferrosilicon	
	4 shovels powdered coke	
1.55	No. 6 samples taken; added	
	25 lb. ferrosilicon	
	7 lb. ferrosilicomanganese	
	then stirred very intensely	
2.32	No. 7 samples taken, after the heat	

(Continued on page 1845)

Machine Tool Industry Thriving

While There Is Ample Plant Capacity to Turn Out Orders, Shortage of Skilled Labor Is Being Felt—Some Rising Tendency in Wages Noticed

THAT the country is in a real state of prosperity, even tinged in some particulars with a boom complexion, was the general opinion of machine tool builders who attended recent regional meetings of the National Machine Tool Builders' Association. One of these meetings was held at the Hartford Club, Hartford, Conn., Dec. 8, and the other at the Chamber of Commerce, Rochester, N. Y., Dec. 11. H. M. Lucas, of Cleveland, president, presided at both meetings.

The association reports that "our industry has about as much business as we can reasonably expect at this time. While the industry has ample plant capacity there is not an ample supply of skilled labor to turn out the orders as fast as they have been coming in. We seem to be witnessing the first stages of a boom condition with delayed deliveries. The labor factor is today actually limiting the production of machine tools. Some rising tendency in wages is also manifest due to this condition. There is an increased cost due to breaking in new men, but until now there is no evidence of a material let-down in efficiency of the men employed."

It was the opinion of those who attended the two meetings that, from the machine tool manufacturer's viewpoint, the situation deserves careful watching so that policies may be readjusted to developments in case orders should show a slackening.

To Chart Sources of Orders

At these meetings it was brought out that the machine tool industry could profit by a statistical report each month of the sources from which orders are developing. It was explained that this would be of great value if, for example, orders from the automobile industry should fall off while orders from other industrial groups were increasing. The information thus gathered would be helpful to every sales manager in deciding where selling efforts could be put forth to best advantage. A number of the companies represented at the meetings indicated they would join in such reports as soon as the forms are sent out.

Depreciation for Cost Accounting

The question of depreciation for cost accounting purposes was discussed at length. It was brought out that inventory quite naturally, over a relatively short time, say one year, reflects changing costs of labor and material due to changing purchasing power of money. As mechanical equipment is replaced with more modern equipment, the new cost of replacement is reflected in the balance sheets, but this would take about ten years before all depreciation is taken from replacement costs on new machines. In the meanwhile the depreciation of the dollar would not be reflected in the depreciation discount. In the case of buildings where the replacement is so much slower, the executive is still more deceived as to actual depreciation if the cost accounts do not reflect depreciation from replacement costs rather than depreciation from cost of acquisition.

Even in the case of land values that have greatly appreciated due to inflation of currency from pre-war periods, the true earning power of the company is not properly reflected if this appreciated value is not set down. The stockholders had originally invested a given amount of purchasing power, and if earnings are merely figured on the dollars which truly represented that purchasing power at one time, but do not represent it now, the executive has not the actual facts before him when he goes to make his price.

It was pointed out that if a machine tool company found it necessary to move out of its present quarters, and either buy or build a new plant, the actual value of the new plant in inflated currency would be immediately reflected on its books. But the old plant as a

social economic unit is worth in production its depreciated value measured in present day dollars. This principle of valuation, it was stated, is well established in the one case of public service utilities and railroads, the courts having decided in numerous cases that the utilities are entitled to earn a fair return on present day values. It was contended that if this is fair for utilities the same principle of equity should apply to any manufacturing business.

Life and Utility of Machinery

A practical point as to life and utility of machinery was brought out. Taking ten years as a fair estimate of the economic life of the equipment in a machine tool shop, the average age of the equipment should therefore approximate about five years. It was held to be valuable information for the executive to have the age of his equipment listed by his accountants, so that a definite calculation of average can be made. If he finds that his equipment averages longer than five years of age, he knows that it is getting obsolete faster than it should. Then if he also finds that his liquid funds are not sufficient to replace enough of that equipment to bring the total to an average of five years, he is faced with something that he should investigate as to his company's policy.

The opinion was given that the form of invoice submitted by the Ford Motor Co. has advantages over the form of the National Association of Purchasing Agents. Although the machine tool association has already indorsed the form of the purchasing agents' organization, it was the opinion of members attending the regional meetings that the Ford form is the better standard and should be recommended for general adoption.

Certain instances of alleged unfair German competition were cited. The association will deal with such complaints through its office in Cincinnati and take such action as may seem desirable.

Regional meetings are scheduled to be held at Cincinnati, Cleveland and Rockford, Ill.

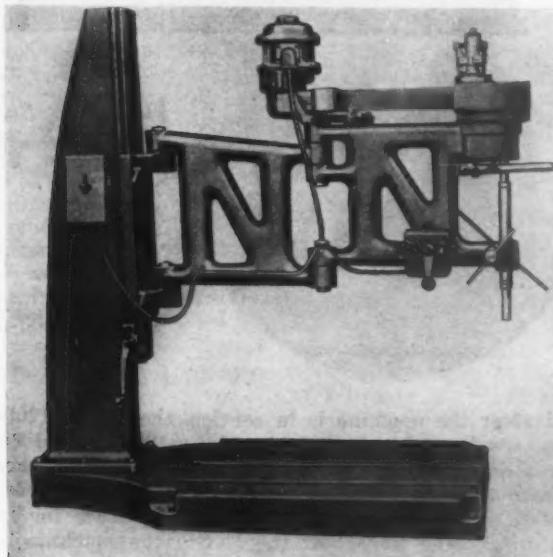
Radial Nut Setter and Stud Driver

A radial stud driving and nut setting machine for the rapid driving of the numerous studs, nuts, cap screws, etc., used in automobile engine, chassis and similar assemblies has been brought out by the Hammond Mfg. Co., 7808 Kinsman Road, Cleveland. In addition to high production, the driving of the studs and setting of the nuts uniformly to any desired degree of tightness is claimed.

From the accompanying illustration it will be noted that the hinged arm feature of the company's radial drilling and tapping machine is incorporated, which feature is stressed as permitting the operator to move the spindle from one position to another with a single straight line motion. The arms are arranged to swing on radial ball bearings. The machine is motor driven, the motor being mounted in a vertical position on the outer arm and belted directly to the spindle driving pulley, as shown. A ball bearing idler for maintaining the proper belt tension is provided and there is a gear reduction of approximately $2\frac{1}{2}$ to 1 between the driving pulley and the spindle. The capacity of the machine is for studs up to $\frac{1}{8}$ in. in diameter and for nuts up to $\frac{1}{2}$ in.

Two types of the machine, column or wall type, are available, the column type radial being equipped either with a full-size T-slotted base or with a pedestal base. The wall or post type machine has the arm assembly mounted on a slide or shoe and has the same vertical adjustment as the column type.

In operating the machine, a nut is inserted in a special socket wrench in the spindle and the spindle started by pressing down on the operating lever, after which the nut is brought down on the stud. When the nut is tight the spindle stops automatically, due to the opening of the driving clutch in the spindle driving pulley. The operator then raises the spindle, inserts another nut and repeats the operation. It is stated that the average time consumed is approximately 5 sec. and that the nuts need no further tightening. The same method is followed in driving cap screws, spark plugs,



Either Column or Wall or Post Type Machines Are Available. The average time consumed in setting nuts is 5 sec. and nuts are said to require no further tightening

etc. By reversing the motor, nuts or cap screws previously tightened may be removed.

For driving nuts to uniform predetermined depth a geared head without the releasing clutch feature is recommended, and also a standard stud driving chuck having split half nuts that release when the stud has been driven to the depth required. A solid threaded chuck is used in connection with the releasing driving clutch. When the stud is driven tight the clutch disengages and the spindle stops. The motor is then reversed and the chuck is backed out.

Standard equipment includes a General Electric 1-hp., 1800-r.p.m., ball bearing induction motor, with inclosed starting switch and with drum type reversing switch where required. A box type work table 22 in. high and with a top working surface of 20 in. by 30 in. may be furnished as an extra. The distance from the spindle to the face of the column is 4 ft. 4 in. maximum and 18 in. minimum. The vertical adjustment of the saddle on the column is 24 in., and the traverse of the spindle is 8 in. The weight of the column type machine with T-slotted base and motor is 2500 lb.

Machine for Sharpening Hobs and Other Tools

A hob grinding machine with vacuum dust remover, built by the Herman Pfauter Works, Chemnitz, Germany, is being placed on the American market by O. Zernickow Co., 15 Park Row, New York.

The machine, here illustrated, is designated as the model FSS. It is intended for use in sharpening spiral and straight fluted hobs, reamers, cutters, taps, etc., and with a special fixture it is said to be adapted for grinding face mills up to 13½ in. in diameter. A vertically adjustable rest is provided at one end of the grinding wheel head in order that the machine may be utilized also for the grinding of milling cutters, drills and other small tools, an independent grinding wheel being employed for this work.

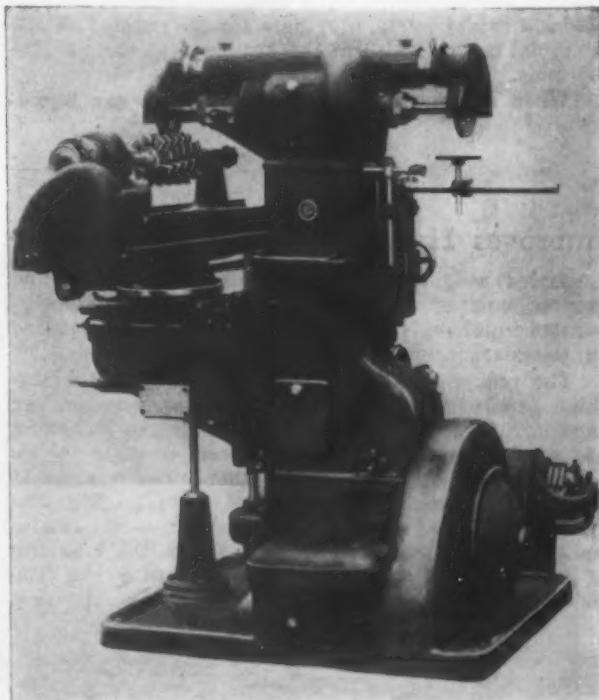
Operation is semi-automatic, the table having full automatic longitudinal feed, while the setting of the

work to the grinding wheel and the indexing from one flute to another is done by hand. With the traverse and return of the table, the work is rotated simultaneously according to the spiral of the flutes, this being accomplished through a change gear arrangement located at the index head. Change gears for different spirals are furnished and also tables for selecting the proper combinations. The table reversing mechanism is claimed to be free from detrimental shock.

The grinding operation takes place both during the advance and the return of the table. A feature of the machine is the vacuum dust remover which exhausts the dust during the grinding operation and deposits it in a water tank at the base of the pedestal.

Single-pulley drive is provided, the machine being driven by belt from the lineshaft, or by direct-connected motor arranged as shown in the illustration. The table may be swiveled 45 deg. in either direction. The grinding spindle is hardened and ground and runs in long adjustable phosphor-bronze bearings. At the side of the machine equipped with the plain grinding rest, the spindle carries interchangeable grinding wheel arbors with taper shaft. An adjustable wheel-truing device is provided, but the diamond used in this device is not included in the accessories. All machine elements are adequately protected from abrasive dust.

The longitudinal feed of table, automatic, is 17¾ in., the cross adjustment 6 in., and the vertical adjustment 9 in. The maximum distance from the center of the grinding spindle to the face of the table is 16¾



Hobs, Reamers and Taps May Be Ground at One Side of the Machine and Milling Cutters, Etc., at the Other. The vacuum dust remover is a feature

in. The maximum distance between centers is 21¾ in., and the maximum grinding diameter between center is 12½ in. The size of the table is 7½ in. by 45¾ in. The largest grinding wheel employed is 7½ in., and a 3-hp. motor is recommended. The floor space occupied is 67 in. by 71 in., and the net weight of the machine is approximately 2270 lb.

Production of bituminous coal in the week ended Dec. 19 is given by the United States Bureau of Mines as 12,600,000 net tons, compared with 12,914,000 tons in the preceding week and 12,868,000 tons in the week before that. These three weeks, at 38,392,000 tons, make the highest total for any period of equal length in recent years.

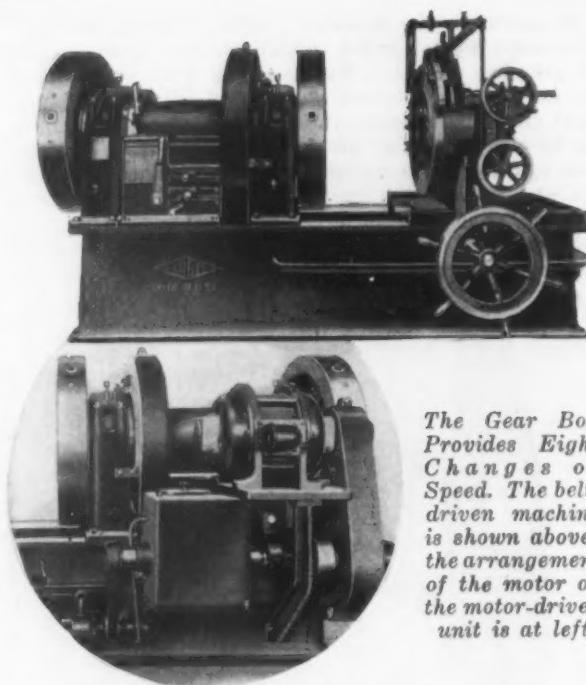
Pipe Threading and Cutting Machine With Range from 2½ to 8 In.

The Landis Machine Co., Waynesboro, Pa., is adding to its line an 8-in. pipe threading and cutting machine, which has a range from 2½ in. to 8 in., inclusive. Two die heads are employed, one 4-in. head for pipe from 2½ in. to 4 in., inclusive, and an 8-in. head for a pipe from 4 in. to 8 in. The entire range of each head is covered by one set of chasers. The travel of the carriage of the machine is 24¾ in.

A full view of the machine equipped with gear box and arranged for single-pulley drive is shown herewith, the application of the motor drive to the same machine being shown in the insert. The gear box is located beneath the main spindle and provides eight variations in speed. All gears are of steel, have cut teeth, and run in an oil bath. The shaft bearings are lubricated automatically by a forced feed system, the main bearings being lubricated by flat link chains running in oil reservoirs.

The front and rear gripping chucks have universal adjustment and are self-centering to the pipe. The rear chuck is equipped with flange grips for screwing flanges on and off. Both chucks have three jaws. A feature stressed as exclusive is the reverse drive, which is located in the gear box and is used for putting on and taking off flanges, the reverse being controlled by a conveniently located lever. The cross rail supports the die head and is fitted at the rear with centering jaws, cutting-off tools, reaming tool and length gage. The company's stationary die head and "long life" chasers are employed. The die lubricating system includes a rotary pump, a by-pass for the surplus oil and a special control valve at the head and at the cutting-off tools.

When arranged for motor drive, which can be ap-



The Gear Box Provides Eight Changes of Speed. The belt-driven machine is shown above; the arrangement of the motor on the motor-driven unit is at left

plied after the machine is in service, the 10-hp. 1200-r.p.m. constant speed motor employed is mounted on a plate over the gear box, as shown. All control levers on the machine are located conveniently on the operating side. The floor space occupied is 4 ft. 9¾ in. by 9 ft. 3 in. The weight of the belt-driven machine is 9750 lb., and of the motor-driven unit with motor, 10,500 lb. The driving pulley is 14 in. in diameter and the belt 5 in. wide.

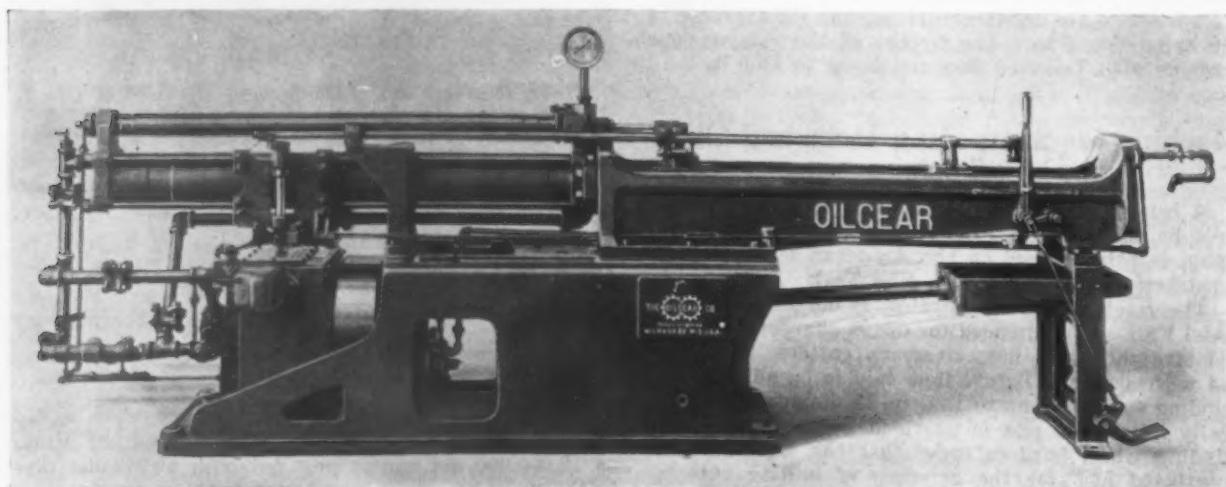
Improves Hydraulic Broaching Machine

Added weight, both in the base and trough, and greater capacity, are among the improvements incorporated in a new No. 3 broaching machine being placed on the market by the Oilgear Co., Milwaukee.

The pump or power unit which operates the machine has been improved to give a maximum pulling capacity of 25,700 lb. The speed of both the broaching and return strokes may be varied from 48 in. to 360 in. per min. independently of each other. The machine is equipped with a foot pedal control, which permits the operator the use of both hands at all times. It is also equipped with a safety device to prevent the breaking of broaches on either the cutting or return stroke. The control of the machine is arranged so that the ram

may be stopped or reversed at any point of its stroke at the will of the operator. The power consumption of this machine is said to be in direct proportion to the pull required on the broaches, and an efficiency of 90 per cent is claimed. The drive may be from any constant-speed source of power.

An outstanding claim for the machine is that the cuts may be started without shock. The pull is steady, without vibration, and the speed does not vary, regardless of the resistance to the cutting tool. A direct-reading pressure gage showing the amount of pull in pounds to which the broaching tool is subjected, is a convenience for the operator in determining when his broach is becoming dull and in need of redressing. It is claimed that because the broach is not subjected to mechanical shocks, the tool has a longer life than usual.



The Pump or Power Unit Has Been Improved to Provide Maximum Pulling Capacity of 25,700 Lb. Both broaching and return strokes may be varied from 48 to 360 in. per min. independently of each other. Pedal control is provided and the ram may be stopped and reversed at any point

Large Roll Grinding Machine

Equipment For Carnegie Steel Co.'s Munhall Plant Has Capacity For Work 54 In. In Diameter and 21 Ft. Long—Four Driving Motors Used

THE roll grinding machine being installed in the Munhall, Pa., plant of the Carnegie Steel Co. is notable not only for size but also for features of construction. It was built by the Norton Co., Worcester. Its capacity is for rolls 54 in. in diameter and 21 ft. long and the machine, therefore, ranks as one of the largest, though not the largest, grinding machine ever built, a machine of the same type for rolls 78 in. in diameter and 28 ft. long having been constructed by the Norton Co., in 1918.

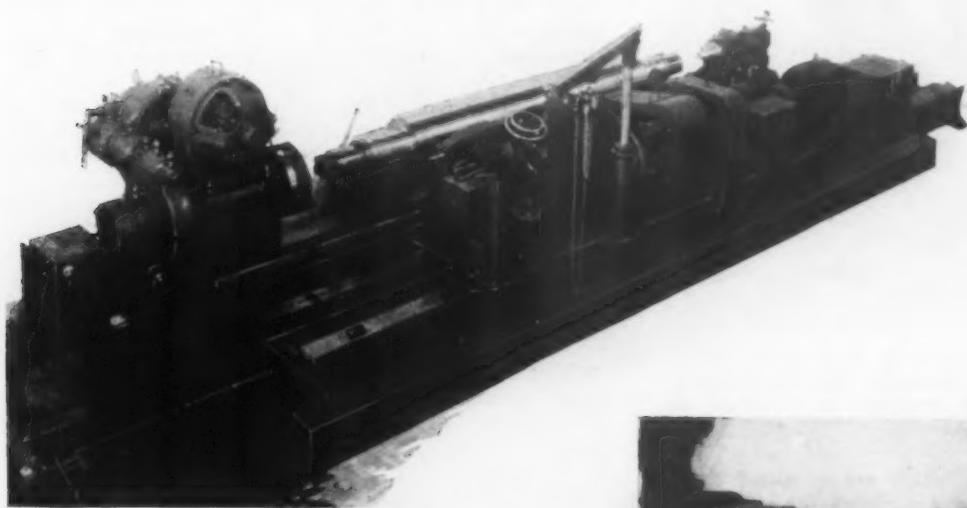
Forced lubrication, push-button control, and the application of a reversing motor for the table drive are among the outstanding features of construction. Four motors, having a combined rating of 70½ hp., are employed to drive the machine.

The wheel carriage, which is the traversing member, is a self-contained unit mounting the motors for

vice is also used for truing the face of the wheel. For convenience when truing a wheel not requiring a radius a plain table type diamond tool holder is provided.

Two beds support the units of the machine, the wheel carriage and the work. Each bed is made up of three sections bolted end to end and mounted on a concrete foundation. A channel between the beds drains the grinding compound into a settling tank from which it flows to the pump pit. The 1500 gal. of cooling compound is delivered to the wheel by a pump which is driven by a 3 hp. vertical motor.

The headstock, fixed on the work bed, weighs 10,850 lb., of which 1900 lb. is in the spindle. The spindle is 12 in. in diameter with a total bearing length in its two boxes of nearly 52 in. A 20 hp. adjustable speed motor on the headstock drives through a spur gear reduction train to a worm meshing with the spindle gear,



With Capacity for Rolls 54 In. in Diameter and 21 Ft. Long, the Machine Ranks as One of the Largest of Its Type

traversing the table, driving the wheel and operating the pump. A 7½ hp. adjustable speed reversing motor operates the table, driving through a reduction box to give seven traverse speeds.

The operator's position on the table permits him to view the contact of the wheel and the work, while in front of him are the hand wheels for operating the feed of the grinding wheel and the hand traverse of the table when locating the wheel to a shoulder. Also, at his hand are the controls for operating the automatic traverse of the carriage and the power movement of the wheel, and the panel on which the motor switches and controls are mounted, push-button switches giving him instant control of the entire machine.

The grinding wheel is driven by a 40 hp. adjustable-speed motor, the final drive being through a 10-in. endless belt having a weighted idler to maintain a constant tension. The range of spindle speeds provides efficient wheel speeds as the size is reduced by wear. To facilitate the movement of the wheel through considerable distance a power movement of the wheel slide is available. Before engaging this mechanism it is necessary to operate a safety lever which throws out of mesh the hand wheel, thus safeguarding the operators.

A wheel 24 in. in diameter and having an 8-in. face is employed on the roll body, while a similar wheel with a radius formed on the corner to produce the fillet is used in the neck grinding operation. A radial truing device having a diamond permits of truing accurately to the radius desired. By locking its spindle the de-

Convenient Location
of Controls May Be
Noted from View of
Operator's Position
on Wheel Carriage,
Shown Below



which runs in an oil bath. End thrust of the spindle is taken by a roller bearing. A tool steel center 6 in. in diameter is used in setting up work for supporting the roll while grinding the journal bearings. The foot-stock is movable on the bed with a hand ratchet.

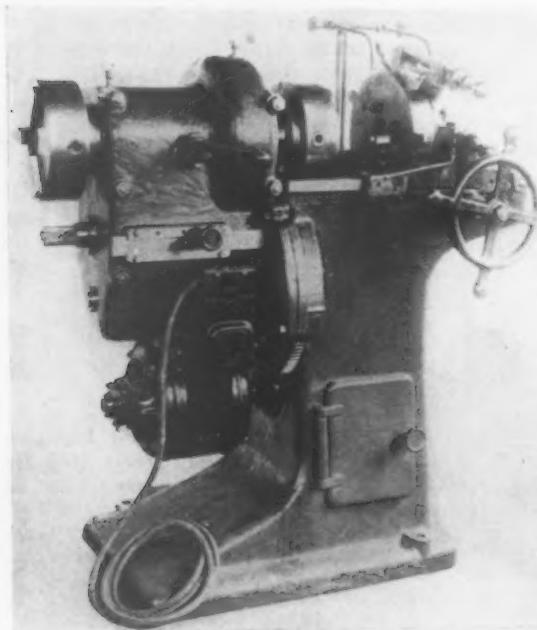
A special set of heavy three-bearing journal rests were provided with the machine to support the roll during the body grinding operation. Adjustments are furnished to align the roll in relation to the wheel and to compensate for the reduction in the journal size from grinding and the wear of the brasses. An attachment for use when forming of the roll face is required is available.

The Rivett Lathe & Grinder Corporation, Brighton, Boston, has entered on the manufacture, as one of its products, of the Forkup system, an equipment for lubricating Ford automobiles.

Pipe Threading Machine for Production or Portable Use

The Chicago Pipe Threading Machine Co., 1615 Racine Street, Racine, Wis., is bringing out the $\frac{1}{4}$ to 2-in. power pipe threading machine shown, which is intended for both production and portable use. The machine may be used also for threading bolts from $\frac{1}{2}$ to $1\frac{1}{2}$ in. in diameter and for driving hand stocks, with the addition of a universal drive shaft, up to and including 12-in. pipe.

The drive is by motor, which is direct gear connected and which uses current from electric light lines.



The Range Is for Pipe from $\frac{1}{4}$ to 2 In. Bolts from $\frac{1}{2}$ to $1\frac{1}{2}$ in. in diameter may be threaded. For portable use the machine is mounted on wheels

There are three speeds, which are obtained through sliding gears and lever, and a clutch for starting and stopping the machine is located on the spindle, providing control independent of either the motor or the gears. All gears are machine cut and run in oil. Shafts are of generous dimensions and operate in bearings that may be replaced conveniently when worn.

The die head is said to embody new features, the die slots in this machine being conveniently and inexpensively replaced when worn. The quick-opening device is rapid and in the handle is contained the micrometer adjustment for exact, under or oversize threads, as may be required. The face plate is arranged for convenient removal to facilitate cleaning the inside of the die head and changing dies. The supports for the die head are located nearly central.

At the rear of the die head is located the cut-off attachment which is made extra heavy in order to withstand the severe shocks to which the attachment is subjected. All sliding parts are machined accurately and are gibbed to compensate for wear. Absence of vibration in the attachment is stressed as saving broken knife blades, as well as other parts. The reaming tool is mounted on the cut-off block and is actuated by turning the handle toward the center of the machine after the cut, which is accomplished without changing the location of the die head. The centering V-block is of heavy design, all sliding surfaces being machined carefully and gibbed to take up shake or wear. Its location is such that the pipe cannot roll up over the cut-off knife.

The spindle is of heavy construction with hole large enough to pass couplings. On each end are mounted chucks, the front chuck being equipped with pipe-holding jaws, the rear chuck serving only as a centering device for holding long lengths of pipe. Gripping chucks can be applied at both ends if desired. The spindle runs in large bearings that may be conveniently

replaced when necessary. The thread-cutting oil pump is of centrifugal type and operates at 1800 r.p.m. It is located at the lowest level of the reservoir, is primed at all times and has no gears to wear. Overflow valves are not required when the oil is shut off at the die head.

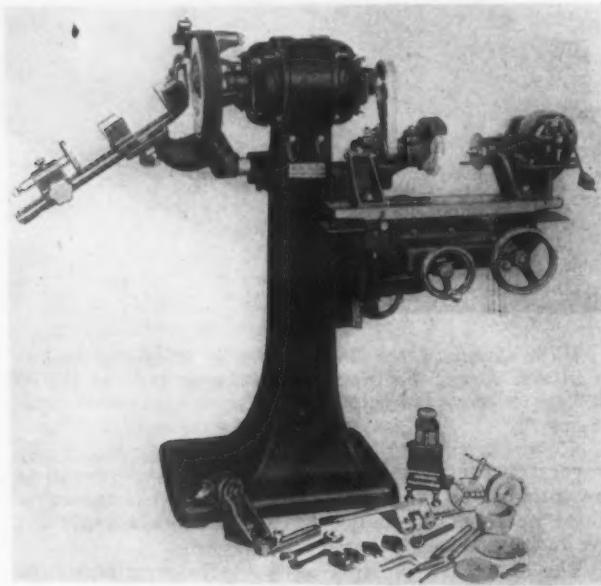
The machine has a pedestal base which incloses the oil reservoir and in which is located a tool and wrench cabinet for keeping dies, wrenches, etc.

Redesigns Combination Drill, Cutter and Reamer Grinder

The combination drill, cutter and reamer grinder of the Gallmeyer & Livingston Co., Grand Rapids, Mich., has been redesigned to provide for motor drive, as shown in the accompanying illustration of the machine, thus eliminating the overhead works formerly employed.

The driving motor is fully inclosed for protection from dust, and handhole covers are provided for convenience in making bearing adjustments, cleaning the commutator, etc. The drill grinding unit can be provided in various capacities to suit the range of drills used, the holder shown in the illustration being of $\frac{1}{4}$ -in. to $2\frac{1}{2}$ -in. capacity and being equipped with a diamond truing device and safety stop. The drill grinding wheel is mounted directly on the armature or rotor shaft, and a special bearing is provided for the elimination of end play.

The other end of the motor is arranged for driving the cutter and reamer grinding wheel spindle, which is driven by an endless belt with proper ratio of pulley



The Motor Drive Eliminates Overhead Work. The drill grinder can be furnished in various capacities, and a special motor headstock is provided for cylindrical and internal grinding

size, providing the increased speed necessary in the case of the smaller diameter wheels used for cutter and reamer grinding work. Either straight or cup wheels may be employed and either straight or taper work can be handled in either case. Longitudinal, transverse and vertical movements are controlled by conveniently located handwheels. The maximum capacity is for tools $9\frac{1}{2}$ in. in diameter and 20 in. in length, with a longitudinal movement of 15 in., transverse movement of 7 in., and vertical movement of $6\frac{1}{2}$ in.

For cylindrical and internal grinding a special motor headstock is provided, the motor being mounted integrally with the headstock as shown, and taking current from a lamp socket. The work spindle of this headstock is driven by means of a worm, thus providing the slow speed necessary and eliminating the necessity for an overhead drum. The machine is said to be adapted for all types of cutter, reamer and tool work that can be handled on standard universal cutter and reamer grinders.

ROLL WABBLER PLANER

Heavy Traveling Head Machine Accommodates Rolls Up to 56 In. in Diameter

Rigid construction, motor drive and automatic lubrication are outstanding features of the traveling head roll wabbler planer here illustrated, which is being placed on the market by the Morton Mfg. Co., Muskegon Heights, Mich. The machine is of push-cut type and is designed to plane the wabble ends of rolls of all types, the capacity being for rolls up to 56 in. in diameter and necks up to 28 in. in diameter.

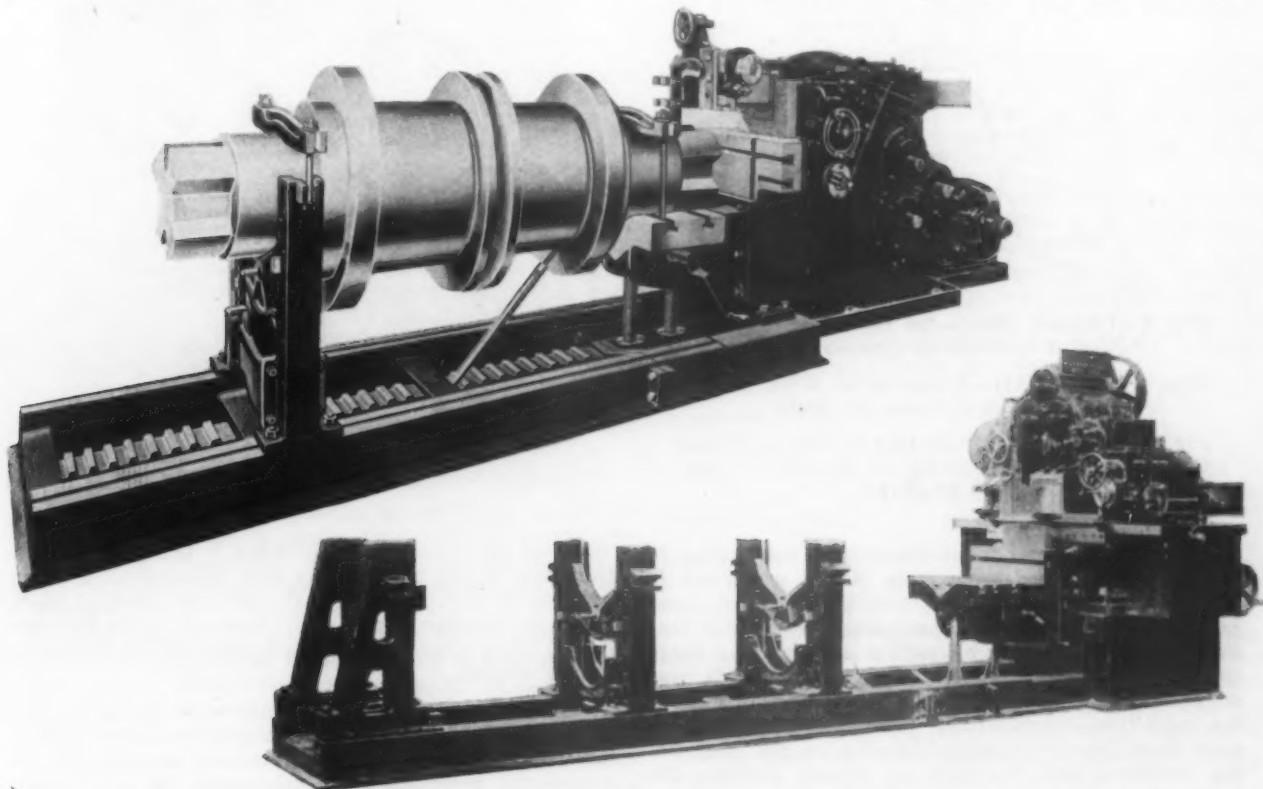
The base of the machine is made up of two units, with extended rails which form a guide and backing for cradling the rolls. The bed on which the traveling head unit is mounted is pinned to the base so that it may be swiveled at an angle for machining roll ends that are tapered. The main column of the machine moves horizontally on its bed and is provided with power feed and also power traverse.

The base of the machine is made in two sections for convenience in shipping. The outer support for

gibs being provided to take up wear. All feeding and operating mechanism is contained in the traveling head and moves with it, and the driving gears are inclosed in the column and operate in oil.

The ram is a square hollow bored steel forging, accurately ground to a bearing. The rack is cut from the solid and a bronze strip is inserted centrally with the rack face, which forms a continuous bearing. Wear is taken up by means of adjustable taper gibs on the side and top of the ram. One end of the ram is threaded to receive the cutter head. The cutter head is of steel throughout and is held in position by means of a special clamp. The slide is fitted to the base and has V-bearings with gibs for taking up wear. The head is also equipped with tapered steel side plates having square rail bearings. Special provision is made for taking up the wear of the head adjusting screw, and the usual side locks are provided.

The reciprocating motion of the ram is obtained by means of friction clutches and compound disks which are located in the column and run in oil. The clutch for stopping and starting the machine independently of the motor is also self oiling. The reversing mechanism for operating the clutches on the



The New Traveling Head Roll Wabbler Planer Is Shown in the Lower View, the Machine Above It Being the Company's Pillar-Type Roll Wabbler Shaper. Mounting of rolls and arrangement of center rib with rack teeth for bracing the rolls are the same in both, but the new planer has greater capacity and is more rigid.

the roll is adjustable along the base, and the center rib of the latter is provided with rack teeth for bracing the roll to take care of end thrust.

The bed of the machine is of box section and has square rail bearings on top, to which the traveling head unit is fitted. Bolted to the front of the bed there is a plate with vertical square rails, and to these, in turn, is fitted the angular knee or table. This knee has Vees cut in its upper surface for supporting the neck of the roll to be machined, T-slots being also provided on the upper surface for bolting purposes. The vertical section of the knee is provided with a horizontal T-slot so that parallel bolts may be used for holding the rolls against the cutting strains. Vertical adjustment of the knee or table, to accommodate rolls of different sizes, is by means of a screw which is operated by a crank and bevel gears and which works against a ball thrust bearing. An auxiliary screw serves as an outer support for the knee.

The traveling head column is of box section and is heavily ribbed. It has square rail bearings fitted closely to the square rails of the bed, special angular

reciprocating stroke is said to be of new design with a sliding bar and revolving cam, the construction being simple and the adjustment convenient. All small parts are case hardened. The stroke is adjusted by tappets on a circular disk and adjustments can be made while the machine is in operation. It can be reversed at any time by means of a lever, and it is claimed that the machine will take a cut and reverse close to a line.

The main driving pinion is of a steel forging with the teeth cut from the solid and it runs in oil. A 10-hp. motor is employed and is mounted on a bracket at the rear.

The machine is regularly built in one size only, although larger units can be furnished for special requirements. The stroke of the ram of the present machine is 32 in. and the length of bed, 72 in. The maximum longitudinal feed of the traveling head column is 16 in., and the feed of the tool head is 10 in. The maximum distance from the inner to the outer V-block is 14 ft. The vertical travel of the inner V-block is 14 in., and the largest diameter accommodated between the tool and the V-block is 28 in.

GEAR TESTING EQUIPMENT

Tooth Comparator and a Lapping and Testing Machine Introduced by Farrel Company

The Sykes gear-tooth comparator, marketed for the past few years in England, will be manufactured in this country by the Farrel Foundry & Machine Co., Buffalo. The Farrel company is also offering a gear-lapping and testing machine for use in connection with the Sykes gear generators for testing gears after they have been cut.

The gear-tooth comparator is intended as a production as well as a precision instrument. It permits of obtaining quickly the exact depth of setting of the gear cutting tool, and finished gears, it is claimed, can be gaged in less than half the time taken when the older form of gear tooth caliper is employed. It is claimed also to be at least ten times as durable.

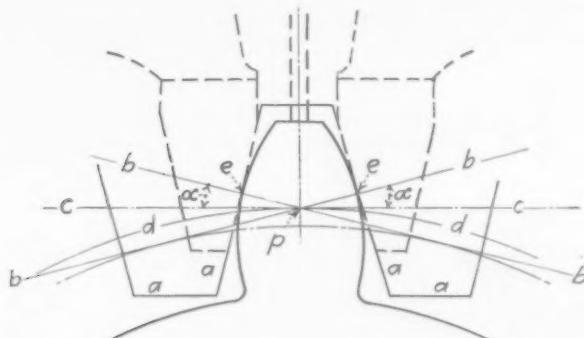


Fig. 1 (Above) Illustrates the Principle of the Sykes Gear Tooth Comparator

Fig. 2 (at Right)—Comparator With Master Gage Block Between the Jaws

Fig. 3 (Insert)—After Setting Is Obtained from Gage Block the Instrument Is Applied to Gear Tooth as Shown

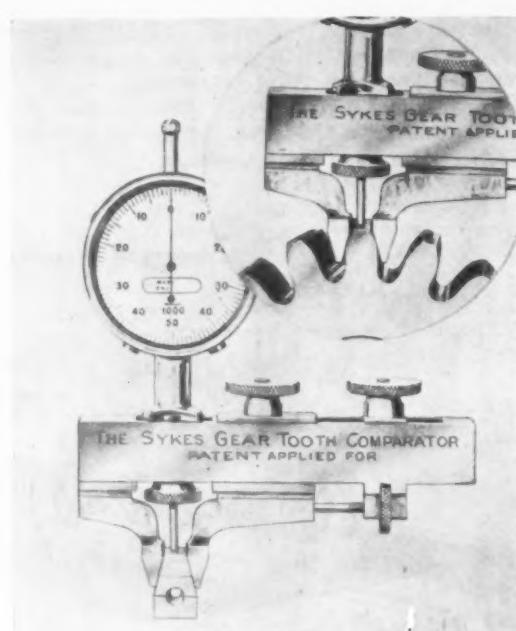
In the Sykes gear-tooth comparator the setting of the jaws is obtained from gage blocks, which are in the form of rack teeth, and it is claimed that these gage blocks do not wear appreciably, even with constant use, because the contacting surfaces are large and are made intensely hard. The gage block is used infrequently, being applied only to the instrument for obtaining the correct setting. The jaws of the instrument itself take a tangential bearing on the teeth being measured and the point of contact between the jaws and the teeth will vary on different gears, thereby distributing any wear there may be. It is pointed out, however, that this wear does not affect the precision of the instrument because the jaws are always set to the master gage block.

The principle of the instrument may be noted from Fig. 1. The lines *a*, *a*, *a*, represent the outline of rack teeth and the dotted outline the jaws of the Sykes comparator. These, it will be seen, follow the rack outline. The line *c* is the pitch line of the rack and *d* the pitch line of the particular pinion or gear shown; *bb*-*bb* are the lines of pressure or lines of action on which involute tooth contact occurs, whatever the size or number of teeth of the gear. These lines are always the same for any given pressure angle α .

It is well known that in the involute gear system the rack tooth has straight sides; and also that the first law of gear tooth contact is that the common normal to the tooth curves must pass through the pitch point. In the diagram, the pitch point is *p*, and the lines *b* pass through it and are normal to the rack tooth profile. It is pointed out that contact must always take place on the lines *b*, and that the position of the point of contact *e* depends only on the thickness of the tooth. In gears of any particular pitch the profile of the teeth is different for each number of teeth, but

the point of contact, *e*, will always be the same, providing the tooth thickness is the same. It will vary in direct proportion to the tooth thickness.

The comparator with the master gage block between the jaws is shown in Fig. 2; this gage block sets the instrument for gaging the teeth of the gear as shown in Fig. 3. It is said to be preferable to use a gage block which corresponds to the teeth to be measured, that is, the gage block should represent a theoretical rack tooth of the same proportions as the theoretical rack would have. It is not necessary, however, to have a gage block of the exact size, because teeth larger or smaller than the gage block may be gaged accurately. For example, it is possible with the 2 D. P. tooth block to measure $2\frac{1}{2}$ D. P. teeth. A set of seven tooth blocks will measure every pitch with



standard or non-standard between 9 D.P. and 1 D.P. Or a set of six gage blocks will measure all pitches between 12 D.P. and $1\frac{1}{2}$ D.P., or $\frac{1}{4}$ -in. circular pitch and 2-in. circular pitch. It is, however, more convenient to use a gage block which corresponds to the teeth to be measured.

It will be noted that the comparator first compares the thickness of teeth with the master gage block; thus the exact thickness of the teeth can immediately be determined, providing the thickness of the gage block is known. The gage blocks are made half the circular pitch on the pitch line. The actual amount of discrepancy in the teeth can be noted either in terms of the actual dial reading or in terms of tooth thickness. If the pressure angle is $14\frac{1}{2}$ deg., 0.001 in. on the dial represents $0.001 \div 1.933 = 0.000517$ in. on the thickness of the tooth, or for all practical purposes 0.001 in. on the dial represents 0.0005 in. on the tooth thickness. Conversely, 0.001 in. on tooth thickness equals 0.00193 in. on the dial indicator. When the exact block corresponding to the tooth to be measured is not available, the setting of the jaws may be obtained from either a table of differences or by a simple calculation.

The instrument is claimed to measure tooth thickness within 0.0002 in. and can be used with greater facility than the usual gear tooth vernier, and the use of the instrument is not being dependent on the skill of the operator. The instrument is furnished in a box complete with a set of gage blocks for standard pitches from 12 D.P. to $1\frac{1}{2}$ D.P. inclusive. The instruments and gage blocks are made as standard for $14\frac{1}{2}$ deg. pressure angle, but can be furnished for other pressure angles. The standard instrument has a capacity for

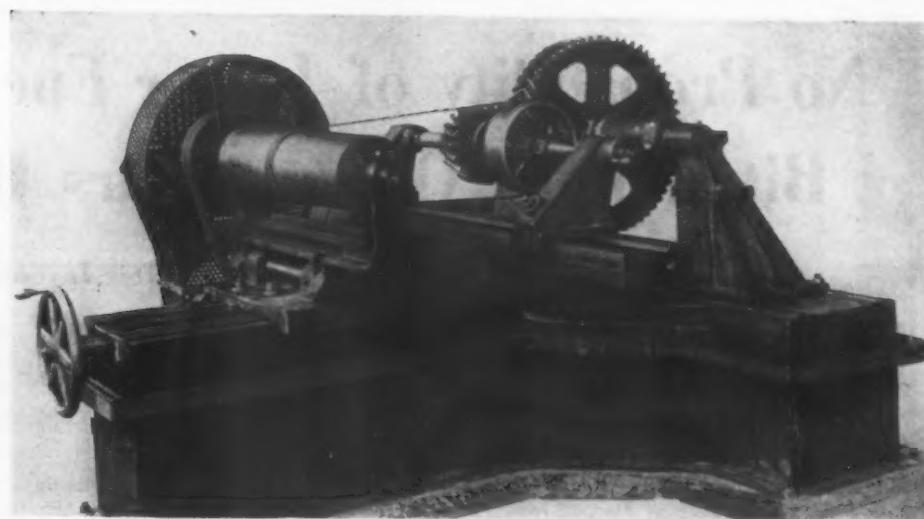


Fig. 4—Machine for Testing and Lapping Gears Cut on Sykes Gear Generators

measuring teeth of 12 D.P. to 1 D.P. and from $\frac{1}{4}$ in. to 3 in. circular pitch.

Sykes Gear-Lapping and Testing Machine

The gear-lapping and testing machine, also here illustrated, was developed for use in testing gears after being cut on Sykes gear generators. The capacity of the machine is for gears up to 48 in. in diameter.

The gears are mounted on arbors and set to run in a pair of pedestal bearings on the bed of the machine. One of these pedestals is adjustable in T-slots cut in the bed to accommodate varying widths of gears. The other is bolted to the bed. Two other pedestal bearings for the pinions to be tested are mounted so that both are adjustable along ways on the carriage, which in turn can be moved on the main bed by means of a hand-wheel and lead screw. The second pair of bear-

ings can be arranged to carry an arbor, or to carry the pinion when it is integral with the shaft upon centers.

A split steel pulley is secured on the pinion arbor and serves to rotate the pair of gears by belt connection to the driving drum which is pivoted on the rear end of the carriage. A motor set on the floor drives this drum.

The gears to be tested are cleaned, then placed in the machine and rotation is started. Defects that may cause noises are at once discernible along with other characteristics of the teeth. Lapping compound may be introduced if necessary between the teeth, and the action watched until the results desired are obtained. A scale, with vernier attachment, is fitted for measuring the distances between centers.

Horizontal Percussion Power Press

A new type of percussion power press, developed primarily for use in plants manufacturing industrial railroad equipment has been placed on the market by the Zeh & Hahnemann Co., 182 Vanderpool Street, Newark, N. J.

The machine is constructed to exert, normally, a pressure of 100 tons; is horizontally arranged to permit the work suspended by a runway to pass freely through the press for riveting operations. Several rivets are headed cold at each stroke of the press. The drive may be by direct-connected motor, as shown, or by belt. The press has a spacious gap or throat and is controlled by foot treadle in a manner similar to the usual type of press. It stops positively at the end of the reverse stroke and is held there by means of a brake, the friction disks being in neutral position. As the work or die terminates the working stroke of the press, an emergency stop is provided to stop the machine positively and safely in case the empty press

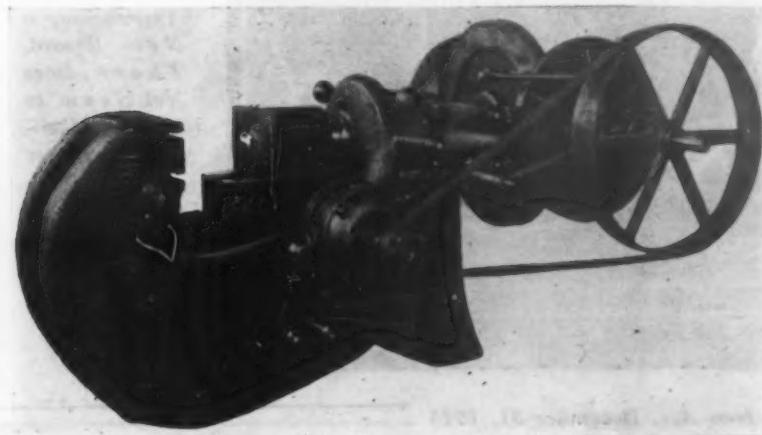
should be tripped. The length of the stroke is 10 in.

The frame is a steel casting. The weight of the press is 10,500 lb.

Valve for High-Pressure Service

A forged steel body, uniform section of body walls, full opening and straight line for steam flow, which minimizes the resistance, are features of a new straight-way valve which has been added to the line of the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. The valve is designated as the Forgesteel and is intended for high-pressure and high-temperature service.

The seat disk, steam and packing nut are of monel metal. Large packing space is provided, and it is claimed that the valve can be repacked in 5 min. without disturbing operating conditions. The yoke of the valve is of steel, the stem is unusually large and has Acme threads to assure maximum strength. All parts are made to gages and are interchangeable.



Power Press Arranged Horizontally to Permit Work to Be Suspended from Hoist and Pass Freely Through Press for Riveting Operations. Several rivets are headed cold at each stroke

No Probability of Lower Fuel Prices: Bituminous Output Nears Record

**Bituminous Quotations Likely to Firm Up After Inventory Taking
Period; Furnaces Well Covered on Coke**

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

BITUMINOUS coal production continues on the up-grade. In the week of Dec. 12 over 12,898,000 tons were produced, which is getting close to record output, and has not been exceeded since 1920. The total output for November was the highest of any month this year, and was nearly up to the peaks reached in the winter months of earlier years. Usually the largest output occurs in January, February or March. If the present trend is continued, the monthly bituminous coal production will come to exceed all records.

The reader must remember that the coal production curve shown in Fig. 1 is "adjusted for seasonal variation." In November of this year the adjusted index shows an increase of nearly 3 per cent.

Stocks of coal held for industrial use have not yet been estimated for last month, but may show a further gain. Probably, however, such stocks are nearly at the peak, since there is now no fear of fuel shortage and since production is so large.

Prices Average Higher

Bituminous coal prices averaged higher in November—the highest since October, 1923. In the first part of December, however, the *Coal Age* composite index declined, falling from \$2.32 on Nov. 24 to \$2.17 on Dec. 15.

Coal production is likely to show a seasonal decrease soon, and if cold weather continues it seems reasonable to infer that prices will firm up and recover from the recent slump. Much depends upon the weather, which, of course, cannot be predicted, but the most probable development now seems to be that after

the effect of the holidays and inventory taking has passed the price of bituminous coal will rise a little. No reason is apparent, however, to look for any large increase. In fact, it is difficult to see how bituminous coal prices as measured by the *Coal Age* index can rise above \$2.32 during the next few months.

Coke Still Fluctuates

THE production of coke, including both beehive and by-product varieties, showed a large increase in November, though the rate of gain was not quite so great as in October. The November output was the highest since July, 1923. In connection with the large bituminous output this fact indicates pretty conclusively that the fuel supply will be ample this winter.

The spot price of furnace coke at Connellsburg averaged lower in November, being \$5.75, against \$6.30 in October. Last week the price advanced rather sharply on Thursday, being quoted at \$5.50 to \$5.75. This is a large recovery from the bottom of \$3.50, reached in the earlier part of December.

Evidently at that time the supply of coke was temporarily in excess of demand. This was partly due to weather conditions and to a doubt as to the prolongation of the anthracite strike. Imports, too, have been a small factor in the situation and pig iron producers appear to be well covered.

At the present time, however, it seems uncertain how long the anthracite strike will be continued. Blast furnace activity is on the increase. The weather has recently been more seasonable. In the week of Dec. 12 production of beehive coke showed a sizable decrease.

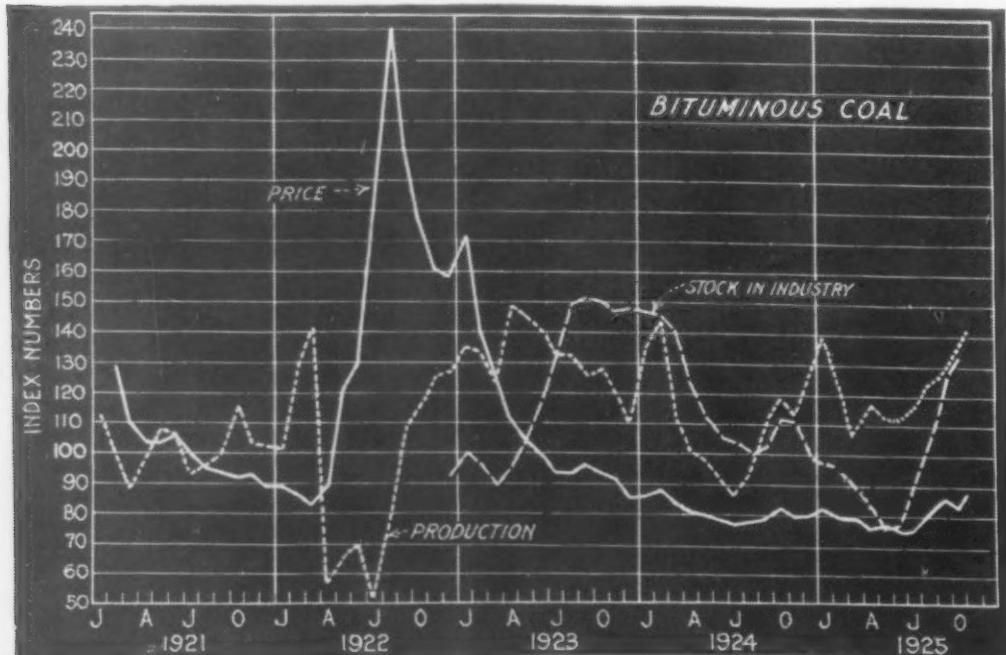


Fig. 1—Despite Increased Output and Stocks Rapidly Approaching a New Record, There Does Not Seem to Be Any Likelihood of Lower Prices

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Production of soft coal and coke show gains in November.—If cold weather continues and anthracite strike is not settled, prices of coal are apt to firm up.—Page 1810.

Stocks of zinc drop again but production now highest in years.—World output also gains; prices still firm but no likelihood of advance with larger tonnage being produced.—Page 1813.

Increased plant capacity and prompt transportation have nearly eliminated forward buying.—If railroads should become congested or if demand should catch up with supply, steel production cycle would change.—Page 1815.

"The point in which railroads are weakest is in the equipment of repair shops."—Says President Loree of the Delaware & Hudson. President Mitchell of National City Bank, New York, predicts steady improvement by means of purchase of modern machine tools.—Page 1815.

If the average age of equipment in a machine shop is more than five years, watch out for obsolescence.—Figures on average age of machines would be of great help to executives in determining degree of obsolescence.—Page 1802.

British iron and steel industry divided over question of tariff protection.—Government decides against placing duty on incoming steel; British producers must safeguard themselves by adoption of modern equipment and methods.—Page 1814.

Basic process for steel production once considered a fake.—Classed with discredited "Sherman" process, use of bone-black for crucible steel and nitrate of soda for puddled iron; "cure-alls" still get a hearing.—Page 1795.

Proposes specifications for testing of metals used in aircraft construction.—Suggested by N. S. Otey as a basis for engineering discussion.—Page 1797.

Present methods of testing do not fit requirements of aircraft makers.—Light and thin sections, new alloys, smaller factor of safety and other conditions make careful study imperative.—Page 1816.

Extravagant State and municipal expenditures worst feature is drain on productive labor.—Diversion of effort from production of consumer's goods to needless projects hits workers hardest.—Page 1816.

Will financial improvement in Europe mean larger consumption of steel?—Or will better conditions abroad merely mean increased production?—Page 1814.

Dimensions of ingot molds important in production of good chromium-nickel ingots.—Length should be 3 to 5 times maximum width of cross section; upper width of ingot should be about 15 to 20 per cent larger than lower.—Page 1846.

Merger of Corona Typewriter Co. with L. C. Smith & Brothers Typewriter Co.—Involves \$12,000,000; plant facilities will probably be enlarged.—Page 1846.

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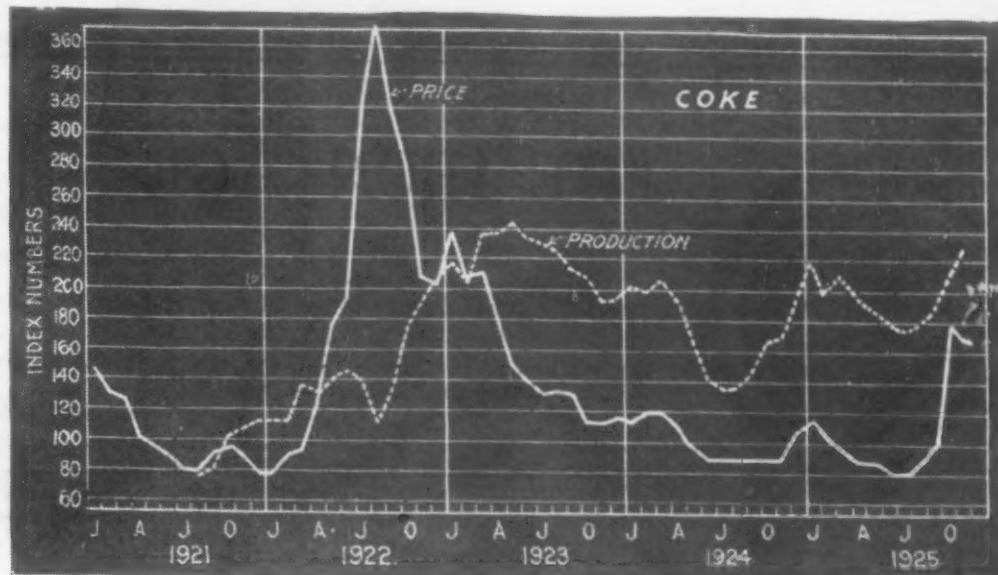
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For Reader Convenience

THIS issue should reach our readers in better condition than usual. It has been mailed flat, which is not so simple as it sounds. A year ago the experiment of flat mailing was tried with the Annual Review number and met with general approval. Time and effort have since been given to the problem of making every issue equally easy to open and hold. The result has led to the method used with this number. THE IRON AGE hopes that it will find favor because of its greater convenience in unwrapping, holding and filing, and because flat copies are more likely to "stay put" when left open. The fact that this forward step costs considerably more than the former method of wrapping is a proof of our concern for the reader's convenience.

For News Summary See Reverse Side

Fig. 2—The Effect of the Anthracite Strike on Coke Prices Is Still Evident in Abnormal Fluctuations



Naturally, therefore, the market has been somewhat firmer.

Zinc Output Up Sharply

THE stocks of zinc in this country declined again in November and amounted to only 6922 tons at the end of that month. During November shipments were in excess of production.

Under the circumstances, the price naturally averaged higher in November than in October, the average being 9.02c. at New York, against 8.64c. in the preceding month. The market has recently been quite irregular, but on Dec. 23 spelter was quoted at 9.05c. in New York.

The retorts operating at the end of November showed another increase and stood at the highest level in years. The world production of slab zinc, as estimated by the American Bureau of Metal Statistics, also gained slightly, the figures for the last three months being as follows: September, 101,500 tons; October, 107,000 tons; November, 107,100 tons. World supplies are estimated to have increased considerably as of Nov. 1.

Stocks Unduly Low

In recent weeks the supply of spot zinc in the United States has been very small and, with stocks at a dangerously low level, the market has naturally been rather firm. It seems noteworthy, however, that in spite of decreasing stocks there has been no more tendency for the price to advance. This may well indicate that the peak of the market has been reached. Certainly the growing output of zinc may be expected to bring an easier supply situation within a very few months.

Polytechnic Institute's New President

Inauguration exercises will take place Jan. 13 at the Brooklyn Polytechnic Institute when Dr. Parke Rexford Kolbe is inducted into office as the new president. More than 150 presidents of American colleges and universities, together with representatives of engineering and learned societies will attend. The American Institute of Consulting Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, and American Society of Civil Engineers will be represented officially.

Two New Bar Mills at Gary

The Illinois Steel Co., Chicago, has started construction on two new bar mills at Gary, Ind. These are in addition to the bar mill which is now under way at the South Chicago works. The additional mills at Gary will give the company an added capacity of 500,000 tons annually.

The commercial aspects of civil aviation will be presented by J. W. Roe, professor of industrial engineering, New York University, and director of the study of civil aviation for the Department of Commerce and the American Engineering Council, at a dinner meeting of the New York Chapter of the Society of Industrial Engineers, to be held at the Cafe Boulevard, New York, Tuesday evening, Jan. 5. At the same meeting the "Technique of Executive Control in Shop Management" will be discussed by Wallace Clark, consulting engineer, New York, and by G. H. Barber, works manager of the Yale Electric Corporation, Brooklyn, N. Y.

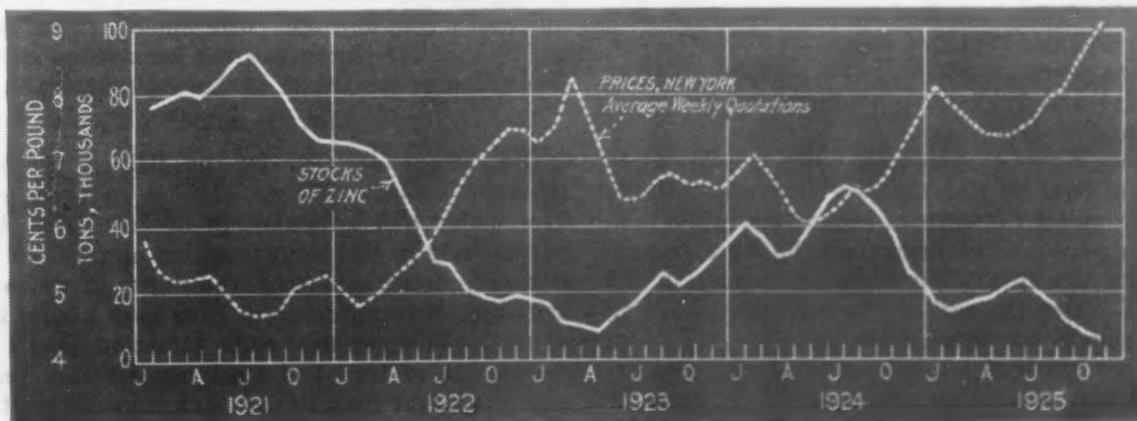


Fig. 3—With Stocks of Zinc Dangerously Low and Prices Soaring, the Need of Increased Output Now Coming into the Market Is Obvious

ESTABLISHED 1855

THE IRON AGE

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Steel Exports at Long Range

AS noted in THE IRON AGE of Dec. 24, our iron and steel exports in the year now closing are the smallest for any post-war year. On the eve of what is promised to be the commercial and financial rehabilitation of Europe a long range look may be taken. There have been many suggestions that Europe is going to offer us sharper competition in export trade.

Estimating 1925 by taking December equal to November, our total iron and steel exports in the seven post-war years have been as follows, the count including scrap as well as pig iron:

Iron and Steel Exports—Gross Tons	
1919.....	4,399,698
1920.....	4,935,137
1921.....	2,213,174
1922.....	1,986,297
1923.....	1,992,595
1924.....	1,792,421
1925.....	1,780,000

The last two years were 10 per cent under the two preceding, and 62 per cent under the first two post-war years. There is a progressive decrease of very marked character.

The question will naturally be asked, how these exports compare with our pre-war average. The rejoinder is that we had no average. The two years, 1912 and 1913, had a mean of 2,850,000 tons, but two years do not make an average. Except for 1910 and 1911, no preceding year had been even half so large.

From a few occurrences, quite insufficient to make a rule, we had the idea that export trade was an outlet for surplus production, when conditions were poor at home; but the more general testimony is that when business is poor in the United States the rest of the world is unwilling or unable to buy much from us.

There has been much loose thinking about export trade, exemplified particularly in some of the comments made upon the new future now apparently opening up for Europe. The looseness is chiefly in thinking of each commodity in connection with its production, the thinking not being connected closely enough with the circum-

stances attending the consumption of the commodity.

That is, steel has been looked upon as an end, whereas it is chiefly a means to an end. Tin plate for food containers and steel for pleasure automobiles are ends. They represent final and ultimate consumption. Iron and steel for typewriters, printing presses, factories, transportation, represent means to an end—the transaction of business, the increase of commercial operations. Steel in the world's work is a raw material rather than a finished product.

If the world does more work it will need more steel. Financial rehabilitation means not so much that it will be easier for the world to make steel, it means much more that it will be easier for the world to consume steel.

Our own history is very instructive. We had a great future as an iron producer and a great future as an iron consumer. We developed the latter ahead of the former. In 1880 we imported 1,886,000 tons of iron and steel. That was 10.5 per cent of the weight of pig iron produced in the whole world. Can no other country ever develop buying ability of some such order? On the basis that the world's work and progress have been greatly hampered in the past seven years by the conditions the war left, why should it be concluded that the hampering has been more in the production of steel than in the consumption?

THE recent decision by the British Government against placing a duty on iron and steel under the Safeguarding of Industries Act was entirely in line with tradition and was to be expected, notwithstanding the signs of distress British steel manufacturers have been giving for months. The decision calls attention again to the volume of iron and steel imports this year, which is larger than in any year since before the war. For the 10 months ended with October the average was 226,000 gross tons per month, compared with 202,400 tons per month in 1924. The present year's total will approximate 2,700,000 tons, or 225,000 tons per month, which is about 21

per cent more than the average of 185,900 tons per month for 1913. The major factor has been semi-finished steel from the Continent, which made up nearly 41 per cent of the total to Nov. 1, largely from Belgium and France. Lower wages, longer hours and depreciated currency have caused this inflow of basic material which naturally should be produced by British labor. The iron and steel manufacturers themselves are divided on the tariff proposal. Several large pig iron producers and some important steel makers have declared against any protective legislation. Their remedy for present conditions is the reduction of British steel-making costs through modern plant and methods and the concentration of business in the more highly efficient works of self-contained companies. In that program time and much money are important factors. It means the survival of the fittest, the fittest being in general those which adopt the practices of the most efficient American works.

The Yearly Cycle in Steel

REPEATED reference has been made to the parallelisms in the production of steel in the last four years, particularly the expansion in the early months of each year, followed by several months of declining output, and usually an upward trend in the final months. There are two conditions which may have made for the twelve-month cycles. Were there nothing but the regular recurrence of this series of business phenomena each year—restocking (in the first quarter) after the check to purchases for inventory reasons, appraisal of the outlook (the second quarter), action on the appraisal (the third quarter), and then preparation again for the inventory season (the fourth quarter)—we would still need to account for the annual repetition of the upward and downward swings in output.

Political, financial and other influences might reasonably be looked upon as likely to affect the amplitude of the swings. But the two conditions that have played an important part are these: First, increased plant capacity (growing out of war expansion), with the result that periodic scarcity has not been a factor, as it frequently was before the war, when it caused very considerable over-buying; second, the excellent performance of the railroads, resulting in prompt deliveries, so that there was no need of forward buying on any large scale. Should demand for steel catch up on supply, or should there be overloading, or for any cause poor functioning, of the railroads, we might expect to see a considerable warping of the steel production cycle as we have known it since 1921.

OUR recent editorial on "Compulsion With Safety Devices," the pith of which was in the opening sentence, "When it comes to safety devices and clothing and to rules governing their use in a manufacturing plant it has proved costly to owner and worker to leave anything to the worker's discretion," was put to good use at the great plant of the National Transit Pump & Machine Co., Oil City, Pa. G. F. Dennett, the com-

pany's safety engineer, sent for reprints of the article, which were distributed to members of the foremen's and general safety committees, including some of the managing executives, also among the company's 46 foremen. Mr. Dennett makes this comment:

We have found from experience that your first sentence sums up the problem concisely and we who meet this proposition by daily contact appreciate any such endorsement from "those outside or on the fringe of industrial accident experience."

I wish that every employer, manager, superintendent and foreman of our industries might read that short article as an editorial expression of a conservative, authoritative trade publication of the standing of THE IRON AGE, and that they would realize fully that no "safety first crank" or goggle salesman wrote it up or bought the space.

The National Safety Council at Chicago would be much interested in this evident attitude of THE IRON AGE. We need every testimony available to show our fellow-workers that it is no disgrace to do our work safely, carefully, and with a thought for the other fellow. We all know the tremendous waste caused by personal carelessness and its selfish results; and it can be reduced.

Railroad Repair Shops Improving

PRESIDENT MITCHELL of the National City Bank of New York, presenting to the Bankers' Club of Detroit a survey of the chief factors in the present American prosperity, laid stress on the greatly increased efficiency of railroad transportation. This is making it possible for raw materials and products to flow in and out of factories with clock-like regularity, as a result of which inventories are being kept down to a point which five years ago would have been thought impossible. The railroads, he showed, have raised the efficiency of their operations, reducing coal consumption and other expenses, increasing the weight of their trains and the daily mileage of their freight cars. To the reduction of operating expenses improvement in machine shop equipment has been an important contributor.

Everyone familiar with railroad repair shops has realized for years the inadequacy and costliness of their operation. There are exceptions, for some of these repair shops are the last word in equipment and practice. But from this they range down, each lower class being larger than that above it, to shops which, seen through the eyes of machine tool men, are in the museum class, so old and inefficient are their tools. Taking the extremes of the modern and the obsolete, the cost of a repair job in the one is many times the cost in the other.

Even where machinery is not really old it is often no longer fitted to the task imposed upon it, because the nature of the task has changed. As Mr. Mitchell stated, in the last 15 years there has been an enormous increase in the size and tractive power of locomotives, which has led to the adoption of large steel castings and of alloy steel castings and forgings. Naturally much more powerful tools are needed to accomplish the necessary repairs quickly and well. He quoted President Loree of the Delaware & Hudson as saying:

that "perhaps the point in which railroad facilities are the weakest is in the machine tool equipment of the repair shops. The development of machine tools received a great impetus from a war and from the growth of a new industry. During the past 15 years we have had the world war and the development of the automobile business. The effect has been to revolutionize machine tools."

"Locomotives are earning only when on the road," said Mr. Mitchell. "It is evident that cutting down the repairing time of a locomotive will increase its earning time. A minimum of one extra trip a month would produce enough additional revenue to pay not only the fixed charges but return the entire capital investment each year." And this does not take into account the reduction in cost of shop labor and overhead.

Of the work still cut out for machine tool selling forces, Mr. Mitchell observes: "The railroads which are so fortunate that their earnings make them forehanded are getting this equipment, but others, needing it more, are getting it in a piece-meal way."

Who Pays the Rent on Real Estate?

A NEW YORK banker recently deplored the increase in State and municipal taxation, which is offsetting the reduction in the Federal, as being highly adverse to the workingman, for whom it means higher rent, higher food, and diminished surplus for saving. Among other things he remarked:

A skilled worker in New York, with a wife and four children, earning \$8 a day and working five days in every week throughout the year, saves only \$6.46 a week. His four rooms will cost \$40 a month, food not less than \$82, replacement of furniture, household utensils and wearing apparel \$15. This leaves \$28 a month, or \$6.46 a week, which is all he will have to add to his savings account and give his family a few comforts and conveniences.

Let us consider these data. The man earns \$2,080 per annum, which is not only above the average but also higher than by any possibility the average can be. He spends about 23 per cent of his income for rent (including light, heat and water), which is not seriously out of the way. His food costs 45 cents per person per day, which affords good subsistence. His surplus is 16 per cent, which would be high for anybody's saving, but of course in the instance of this typical family it would be absorbed mainly by necessary incidentals.

Our first economic thought is that this man ought to work six days a week instead of five. What an addition to his income that would make right away. If the practice became general no doubt the \$8 daily wage would sooner or later be cut, but so also would the rent bill, the food cost, and everything else.

The mischief of extravagant State and municipal expenditure is not that it raises taxes that are added to the worker's rent, but that it diverts labor from the production of consumers' goods. The worker who functions only five days a week does the same thing.

State and municipal expenditures are met

mainly by taxes on real estate. When they fall on the farmer he does not pass them on to anybody else. He has to take for his produce what the market will give. Similarly with the landlord of tenements in the towns. He is unable to get away with anything so comfortable as the assumption of a desired return upon his investment, to which he will add upkeep, insurance and taxes that the tenant must pay. Rent rates like everything else are determined by demand and supply.

Workmen are often their own greatest enemies. The coal miner plays against the builder; the builder plays against the factory worker; and so on. The inventor, the engineer and the capitalist are the benefactors. If only the workers were not so often blind and selfish they could put a stop to governmental diversion of labor and material from the production of consumers' goods; and they themselves could add to the production of such goods.

But as things are, what does the anthracite miner of Scranton care if the wool spinner of Lawrence is without coal? What does the building mechanic of New York care if the tenements are crowded and rents are high? Each class of workingmen has an eye single to making its own wage higher than the economic average. Of course this is but human nature; but so also is it only human nature for the small boy to crave unlimited mince-pie.

Metals for Aircraft

ALLOYS, whether of steel or non-ferrous metals, have but a limited use in aircraft construction today, as was the case with the automobile in its earlier years. But it is evident that we shall see an increasing demand for steel of unusual dimensions and shapes, and for complex alloys of aluminum and other non-ferrous metals, as the aviation industry expands. Recently the British Government decided to build all-metal airplanes hereafter and in this country the tendency is also in that direction.

This situation gives timeliness to the discussion in THE IRON AGE of Dec. 17 on methods for testing aircraft metals, and to the article in this issue dealing with proposed specifications, these being offered as a basis for discussion. Wide differences exist in the character of the materials in airplanes. They are predominantly thin and light and of maximum strength for such sections. It is evident that present methods of testing and the existing specifications do not fit all the new conditions (especially the smaller factor of safety in aircraft design), which call for utmost assurance. The situation should enlist the concerted effort of American metallurgists, heat treatment experts and other specialists to the end that there may be no retracing of steps in the development of all-metal aircraft in the United States.

The National Association of Brass Manufacturers at a meeting held in New York, Dec. 10, elected the following officers: R. L. Ottke, Pennsylvania, president; H. C. Bulkeley, Illinois, first vice-president, and Wilson Cary, Maryland, second vice-president. The next meeting will be held at the West Baden Springs Hotel, West Baden, Ind., on March 24, 25 and 26.

CORRESPONDENCE

Seamless Tubing Development in the United States

To the Editor: I have read with interest the article on page 1713 of THE IRON AGE of Dec. 17, on Belgian seamless tubes. It seems to me that it might be slightly misleading to those of your readers not conversant with the development of the seamless industry in this country. The capacity of the plant described is given as 3000 tons monthly. It is not clear whether this includes welded as well as seamless product. However, there are plants in the United States producing several times that tonnage of seamless products.

The above is a digression from the main point of my thought and in no way a criticism of the article. What I want to make clear is that the processes and sizes described are paralleled if not bettered in this country.

The seamless sizes given, namely 3 in. to 8½ in.,

are bettered in several plants here. As regards the pipe welded by water gas: This is known here as the horn weld process and at least one, and I believe two or more plants, are making up to 60-in. pipe, or beyond, in this country.

I turned to the article with a great deal of interest because there is a story to be told on this subject. The fact is that foreign inventors have been directing their efforts toward developing equipment for large seamless pipe. They have succeeded by means of an expanding mill in making considerably larger tubes. This is a development of the Mannesman or Stiebel process and not a new process in the sense of being a totally different method. They have also developed the making of very large seamless cylinders by a modification of the cupping or pressing process. There is no practical limit in size for this method.

The statement by the foreign manufacturer that his present opportunity for doing business here is on account of the lack of development in this country can hardly hold so far as the sizes and processes mentioned are concerned. It is purely a competitive proposition. But as for the larger sizes of seamless pipe not described, they will probably control the market for some time.

E. R. KELSO.

Colton, Cal., Dec. 23.

APPOINT COMMITTEES

Board of Directors of American Foundrymen's Association Organizes

The annual meetings of the old and new boards of directors of the American Foundrymen's Association were held in Detroit, Dec. 8. The retiring president, L. W. Olson, presided at the meeting of the old board and A. B. Root, Jr., the president for the coming year, assumed his new duties by presiding over the meeting of the new board.

The report of the secretary, C. E. Hoyt, showed the membership of the association in a healthy condition. In the first 11 months of 1925, 234 new members were elected, contrasting with 169 members elected in the 12 months of 1924. The association's total book membership on Dec. 1 was 1750.

The resolution, which was unanimously adopted at the annual meeting in Syracuse last October, recommending the adoption of a test bar to be known as the international test bar, was on motion approved by the board of directors.

At the meeting of the new board an organization for next year was completed and directors Howell, Erb and Jones were appointed as a nominating committee. C. E. Hoyt was again suggested by this committee for the office of executive secretary, treasurer and manager of exhibits, and R. E. Kennedy, formerly assistant secretary to Mr. Hoyt, was designated for the office of technical secretary. For members of the executive committee to serve with the president, vice-president and executive secretary, there were chosen from among the directors, L. W. Olson, C. R. Messinger, T. S. Hammond and W. J. Nugent. Action was taken on each candidate separately and each in turn was elected by unanimous ballot.

President Root submitted committee appointments for the coming year. The following were named as chairmen of the various sections of the program and papers committee: R. E. Kennedy, general secretary, Urbana, Ill.; Edwin F. Cone, general chairman, THE IRON AGE, New York; E. L. Shaner, Penton Publishing Co., Cleveland, gray iron and miscellaneous section; W. J. Corbett, Steel Founders Society of America, Pittsburgh, steel casting section; W. R. Bean, Eastern Malleable Iron Co., Naugatuck, Conn., malleable casting section; Jesse L. Jones, Westinghouse Electric & Mfg. Co., East Pittsburgh, non-ferrous section; C. B. Connelley, Carnegie Institute of Technology, Pittsburgh, industrial relations section; H. A. Frommelt, Falk Corporation, Milwaukee, training of apprentices section; R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, foundry sand section; A. E. Hageboeck,

Frank Foundries Corporation, Moline, Ill., foundry cost section. Papers for the 1926 convention and the second international foundrymen's congress in Detroit next September will be passed upon by the various chairmen of these sections.

An appropriation of \$2,500 for research during 1926 was authorized by the new board if in the judgment of the executive committee this sum is needed.

No Year-End Cessation at Youngstown

YOUNGSTOWN, Dec. 28.—Changes in operating schedules of Mahoning Valley properties this week include the operation of the plate and 14-16-in. bar mills of the Republic Iron & Steel Co., and the addition by the Sharon Steel Hoop Co. of another open hearth furnace, bringing all of its furnaces into commission.

There will be no general suspensions for the New Year's observance, mill managers have decided, except where mill crews take voluntary vacations and thereby force curtailments.

Of 53 independent open-hearth furnaces, 47 are operating, and 60 of the total of 68, which include those of the United States Steel Corporation subsidiaries.

The Youngstown Sheet and Tube Co. is preparing to start one of the two blast furnaces in its group at Hubbard, Ohio.

Sheet mill schedules are restored to 121 active mills, of 127, due to resumption by the Sheet & Tube company of its eight full-finishing mills at the Brier Hill works.

The Truscon Steel Co. suspends Thursday afternoon for inventory and will be idle for a week.

Mary Furnace in the Lehigh Valley
Blown In

L. E. Thomas, president of the Reading Iron Co., announces that the Mary furnace of the Thomas Iron Co. at Hokendauqua, Pa., a subsidiary of the Reading Iron Co., was put in blast Dec. 22. This is a 500-ton furnace, first placed in blast in January, 1923, and continued in blast until June, 1924, when it was blown out because of business conditions. It is put in blast for the second time in the hope that business conditions will warrant its being continued active for a long period. The furnace will make foundry pig iron almost wholly. It will also make some iron for the Reading Iron Co. A large portion of the ore will come from the Richard mine of the Thomas Iron Co. at Wharton, N. J.

New 12-Ton Gasoline Locomotive

A new gasoline locomotive, known as the model JLB, weighing 12 tons, has been brought out by the Fate-Ro-Heath Co., Plymouth Locomotive Works, Plymouth, Ohio. It is built in all gages from 23 $\frac{3}{4}$ to 56 $\frac{1}{2}$ in., and with a wheel base of 63 in. The length, overall,



A Buda Gasoline Engine Is Employed and Transmission Is of Sliding Gear Type

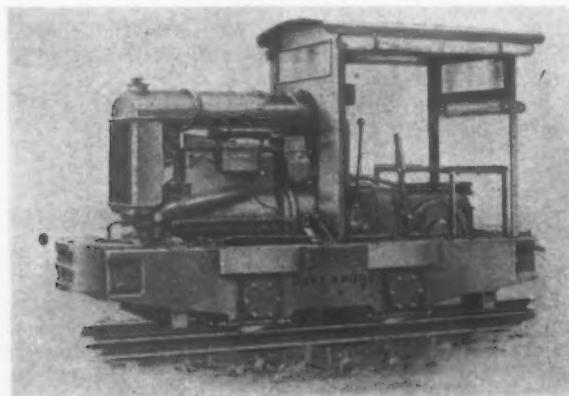
is 15 ft. 8 in. and the height 9 ft. 10 in. Among other uses, the locomotive is adapted to sand pit, mining and factory hauling and switching.

The frame of the machine is of steel and the bumpers are of cast steel. The locomotive is powered with Buda six-cylinder engine, developing 88 hp. at 1400 r.p.m., equipped with Leece-Neville 12-volt starter with Bendix drive and Willard battery. Bosch magneto, Stromberg carburetor, United air cleaner, Pierce governor and Modine sectional radiator are standard equipment. The transmission is of sliding gear type, with four speeds, 3 $\frac{1}{2}$, 5 $\frac{1}{2}$, 11 and 18 mi. per hr. forward and reverse. The gears are of alloy steel, cut and hardened. The clutch is a combination twin disc and Plymouth. Axles are of alloy steel, 5 $\frac{1}{2}$ in. in diameter, and are mounted in Hyatt high-duty bearings. Alemite system of lubrication is provided.

The machine may be equipped with brakes to all four wheels, hand operated, or with Westinghouse direct air system. Sanders are provided to the four wheels. Electric lights, whistle and bell are regular equipment. The cab is made wide to permit of clear vision.

Four-Ton Gasoline Locomotive

The incorporation of a Fordson engine and transmission parts is a feature of the new 4-ton gasoline locomotive here illustrated, which has been added to



Use of Fordson Engine and Transmission Parts Is a Feature

the line of the Davenport Locomotive Works, Davenport, Iowa. In addition to the dependability of the Fordson power plant, the use of these highly standardized engine and transmission parts is stressed as permitting of quick replacement and repair, when necessary.

In designing the new locomotive, accessibility, ruggedness and balanced construction were primary considerations. The design permits the use of a canopy cab, a fully inclosed steel cab, or the removal of the cab altogether. The operating levers are placed within convenient reach at the right hand side of the cab and clear vision is provided in all directions. There are three speeds forward and three reverse and the speed range is from 3 to 14 miles per hour. The maximum tractive power is 2125 lb. The machine starts on gasoline and runs on kerosene.

Cabinet-Type Precision Bench Lathe

The speed with which set-ups may be made and the accuracy obtainable are features claimed for the cabinet-type motor-driven bench lathe illustrated, which is intended for precision turning, milling, grinding, drilling and thread cutting operations in production, experimental or laboratory work. The bed of the machine, which is being marketed by the B. C. Ames Co., Waltham, Mass., is 36 in. long. The headstocks are made for $\frac{5}{8}$ in. and 1 in. spring chucks and the headstock spindle swings 8 $\frac{1}{2}$ in. over the bed.



The Motor Is Mounted Within the Cabinet. Three speeds are obtainable through gears and friction clutches, which are operated by foot treadles

The three-speed gear drive provided is stressed as eliminating the countershaft and jackshaft arrangement usually required to drive this type of lathe from an individual motor. The drive is a simple adaptation of gears and friction clutches designed to operate with foot treadles, the three sets of helical gears running with constant mesh in a bath of oil. The gears are mounted on ground steel shafts which run on ball bearings. A $\frac{1}{4}$ or $\frac{1}{3}$ hp. motor is employed. It is mounted in a compartment under the lathe, and is connected to the gear drive by a single belt extending through top of cabinet. Two speeds forward of 720 and 160 r.p.m. and one reverse of 150 r.p.m. are obtainable. The motor operates from a lamp socket.

The cabinet is 48 in. long, 25 in. wide, and 36 in. high. The total height of the outfit, including uprights and gear drive, is 76 in. A countershaft for driving the grinding attachments may be furnished if desired.

PROSPECTS FOR 1926

Herbert Hoover Appraises Economic Forces For and Against Progress

In commenting on the prospects for 1926, Secretary Hoover, of the Department of Commerce, mentions among the dominant favorable factors our increased productivity, due to such forces as the cumulation of education, the advancement of science, skill, and elimination of waste. Other favorable indications he finds on the immediate horizon are that the stocks of commodities are moderate; there is employment for practically everyone; real wages are at a high level; savings are the largest in history and capital is therefore abundant; and the whole machinery of production and distribution is operating at a higher degree of efficiency than ever before. While wholesale prices for the year as a whole have averaged about 6 per cent higher than for the previous year, it is largely due to needed advance in prices of agricultural products.

There are some phases of the situation, he adds, which require caution. "Continuation of real estate and stock speculation and its possible extension into commodities with inevitable inflation; the over-extension of installment buying; the extortion by foreign government-fostered monopolies dominating our raw material imports; the continued economic instability of certain foreign countries; the lag in recovery of certain major agricultural products; the instability of the coal industry; the uncertainties of some important labor relationships—all these are matters of concern. But with caution we should continue a prosperous year over 1926."

"The volume of construction," he added, "has been unprecedented during the past year, with consequent great activity in the construction-material industries,

iron, steel, lumber, cement, etc. Contrary to normal expectations this increased demand has not increased prices, for there has been a slight reduction in building costs due in a large measure to the gradual lengthening of the building season. The increasing Federal, State, and municipal public works programs for next year, together with the promise of large electrical and railroad extension and improvement, indicate a continuing demand for heavy construction. While it might be thought that the war deficiency in housing has been overcome, yet the high real wage in industry creates a demand for better housing and this condition, combined with migration to suburbs due to the automobile, promises to continue as long as employment remains general. We could hardly expect so exceptional a construction activity to repeat itself, but there will be a large volume in any event."

Exports, he said, will total around \$4,900,000,000, or about 7 per cent more than in 1924. Imports will amount to about \$4,200,000,000, or approximately 17 per cent more than in 1924. "Roughly, one-half of this increase in both exports and imports is attributable to greater quantities exported, and the remainder to advance in prices. . . In essence we are lending foreigners the wherewithall to buy goods from us, or are sending goods to convey our investments abroad. It is probable that the final figures will show that this country has added to its foreign investments during the year by more than a billion dollars."

"On the whole," he said in conclusion, "both our country and the rest of the world face a more favorable outlook at this turn of the year than for a long time past. We, ourselves, however, need to be on our guard against reckless optimism. What we need is an even keel in our financial controls, and our growing national efficiency will continue us in increasing prosperity."

Wants Government to Refund Losses in Producing Manganese Ore

WASHINGTON, Dec. 28.—Suit has been filed in the Supreme Court of the District of Columbia by the Crimona Manganese Corporation, Philadelphia, for a mandatory injunction against Secretary of the Interior Hubert Work, to compel reopening of the claim of the company for losses it says it sustained in producing manganese ore for war purposes. The company alleges that it suffered a loss of \$1,000,000 and has asked that the Secretary of the Interior be compelled to pass on the items going to make up the loss. It is charged that the department has refused to do this.

Proposes Amending National Screw Thread Commission Act

WASHINGTON, Dec. 28.—A commission for the standardization of screw threads, to consist of nine members, will be set up if an amendment introduced in the House of Representatives by Majority Leader Tilson is enacted into law. The Tilson measure would amend the existing act for the standardization of screw threads. The proposed commission would be constituted as follows: Director of the Bureau of Standards, chairman; two representatives of the Army to be appointed by the Secretary of War; two representatives of the Navy, to be appointed by the Secretary of the Navy, and four to be appointed by the Secretary of Commerce, two of whom would be chosen from nominations made by the American Society of Mechanical Engineers, and two from nominations made by the Society of Automotive Engineers.

It would be the duty of the commission to establish standards for screw threads which would be submitted to the Secretary of War, the Secretary of the Navy, and the Secretary of Commerce, for their approval, after which the standards would be used in the manufacturing plants under the control of these departments, and,

so far as practicable, in all specifications for screw threads in proposals for manufactured articles, parts or materials to be used under the direction of these departments.

The bill also provides that the Secretary of Commerce shall promulgate such standards for use by the public and cause them to be published as a public document. The commissioners would serve without pay.

Southern States Support Illinois in Water Diversion Controversy

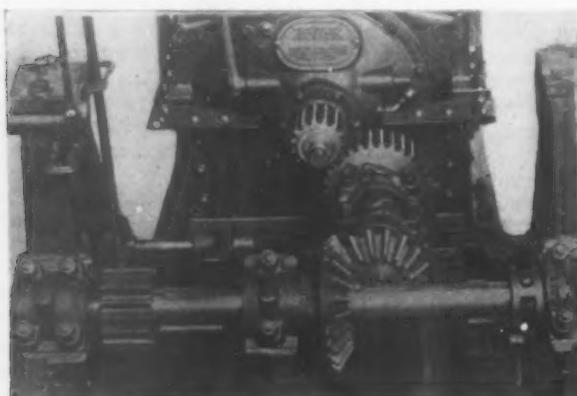
Five States, namely, Louisiana, Missouri, Kentucky, Tennessee and Arkansas, have tentatively agreed to back Illinois in its stand on the diversion of water from Lake Michigan. It will be contended that a flow of 10,000 cu. ft. through the Chicago Drainage Canal is necessary in order that permanent water levels may be maintained in the lower Mississippi River, thus assuring year round navigation. The United States Supreme Court has already held that the War Department may restrict the Chicago Drainage Canal flow. A 9-ft. channel in the Lakes-to-Gulf waterway is the point which is being emphasized by Chicago in order to stimulate interest in the project in the lower Mississippi basin.

Tablet to Henry R. Towne

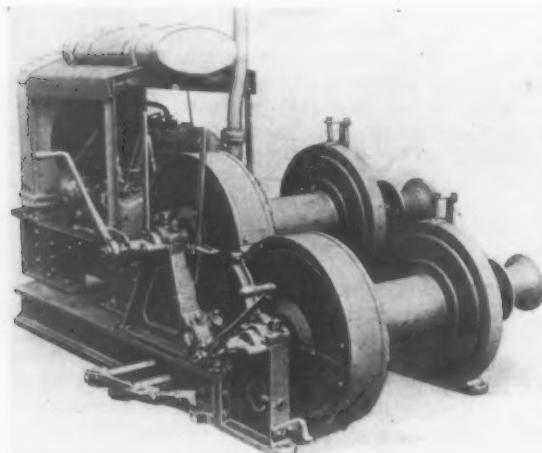
A bronze and marble tablet to the memory of the late Henry R. Towne, former president, has been erected by the Merchants Association of New York upon a pillar flanking the main entrance to the association's offices on the ninth floor of the Woolworth Building. The tablet was designed and executed by J. & R. Lamb. The design consists of an angel in armor holding a sword reversed. The figure is placed upon a dark antique marble upon which the bronze letters of the inscription stand out in high relief.

Gasoline Hoist with Gear Drive

The American Hoist & Derrick Co., St. Paul, Minn., is placing on the market a redesigned gasoline hoist, the new machine having gear drive instead of chain drive as heretofore. The drive is by means of spur and bevel gears with an intermediate longitudinal shaft placed at right angles to the pinion shaft, which is



Gear Drive Replaces Chain Drive, the Arrangement of the Gearing Being Shown Above



the crankshaft on a steam hoist, the gasoline motor being mounted lengthwise instead of crosswise on the hoist.

The pinion shaft of the hoist has a bevel gear near its center which engages with a bevel pinion on the end of the intermediate longitudinal shaft, as shown in the close-up illustration herewith. A spur gear on the other end of this shaft engages with the pinion on the engine crankshaft. The intermediate shaft is mounted at nearly the center, lengthwise of the bed, and is supported by heavy babbitted boxes.

Direct Power Transmission

Among the advantages claimed for the gear drive are quicker shipment of both hoist and driving mechanism repairs, and ability to change the line speed to meet varying requirements without seriously delaying shipment. The principal advantage of the new drive as compared to the chain drive previously employed is said to be that the power is transmitted directly to the pinion shaft of the hoist, which is between the two rear drums, and from there to the friction gears by at least two teeth—one to each adjoining friction gear. In the previous arrangement, it is pointed out, the power was transmitted to the rear drum and from there to the other drums by only one gear tooth.

The hoist is compact and self contained. It is mounted on a cast-iron bed plate, to assure rigidity and alinement of gears, shafts and bearings. The drum equipment is the same as in the company's standard steam hoisting engine, provision being made for growing requirements, which can be taken care of by bolting additional drums to the front of the hoist.

Oil Burner and Preheater

Wide adaptability in foundry, machine and other shop work is stressed in connection with the oil burner and preheater added recently to the line of the Alexander Millburn Co., Baltimore. Among many uses the device is adapted for the preheating of castings before welding. The burner is of the atomizing type and is designed to utilize the cheap grades of crude, fuel, kerosene oil or distillate and compressed air under pressure varying from 50 to 100 lb. The air supply line serves two purposes. While furnishing a direct flow to the burner, the air also maintains a similar pressure in the oil storage tank, creating a greater velocity in the oil feed line, thus, it is said, assuring a positive and uniform flow of both oil and air.

The flow of both air and oil are through straight-line orifices. The oil, under pressure, enters the atomizing chamber at right angles to it and in an annular form, while the compressed air flows directly through the center, striking the filament of oil and atomizing



Uses Include the Preheating of Castings Before Welding. The burner is of atomizing type and utilizes cheap grades of oil

it, then expanding it in a venturi-shaped outlet. Thorough mixture of the oil and air, resulting in complete consumption and maximum heating value at the flame is claimed. There is no siphoning effect of either oil or air, and immediately upon opening the valves the gas at the burner can be ignited. It is stated that carbonization and oxidation are eliminated.

R. S. Hill, Milwaukee, broker in reinforcing bars and other steel materials and supplies, with headquarters at 490 Broadway, has filed a petition admitting bankruptcy. His liabilities are \$18,256 and assets of \$5,897 are claimed. The first meeting of creditors was called for Dec. 24.

The Alchorome Bearing & Castings Corporation, Cheshire, Conn., has filed a certificate of organization with the secretary of that State. Henry N. Bentley, New Haven, is president; Burton L. Hoskins, Hamden, treasurer, and Joseph M. Schwarz, Hamden, secretary. The officers compose the board of directors.

The Western Post & Gate Co., Omaha, Neb., has been incorporated with a capital of \$50,000 to manufacture metal posts, fencing, etc. Incorporators are Abraham B. Alpern and Oscar Carlson, Omaha. The plant is completed and now in operation running to full capacity. The products include farm gates, fence posts and tubular specialties manufactured from tubing.

MACHINERY EXPORTS UP

Heavy Gain in Eleven Months Over Last Year's Shipments

WASHINGTON, Dec. 26.—Exports of machinery in November of the present year were valued at \$30,084,814, against \$31,271,007 in October. For the 11 months ended with November the value was \$347,442,949, a sharp gain over the corresponding period of last year, with a value of \$294,245,529. Exports of machine tools in November numbered 2464, with a value of \$1,007,376, against 3313, valued at \$905,826, in October.

Imports of machinery in November were valued at \$876,113, compared with \$996,557 in October. For the 11 months ended with November machinery imported into the United States was valued at \$8,687,378, against \$9,068,374 for the corresponding period of 1924.

Exports of locomotives in November maintained practically the same volume as to value as in October,

the respective values being \$1,027,702 and \$1,106,422. Of the November exports of locomotives, Cuba took 10, valued at \$196,850, and for the 11 months took 41, valued at \$822,717. Three locomotives, valued at \$66,600, were shipped to Brazil in November, while for the 11 months that country took 86, valued at \$1,945,094. Canada took six locomotives, valued at \$55,535, in November and for the 11 months took 50, valued at \$775,599.

The United Kingdom was the leading destination of exports of sewing machines in both November and during the 11-month period. Sewing machines shipped to that country for the month numbered 9552, valued at \$172,580, and for the 11 months the number was 38,102, valued at \$1,715,573. Mexico took 1263 sewing machines, valued at \$49,606, in November and during the 11 months the number exported to that country was 36,463, valued at \$1,002,296. The United Kingdom took 5670 typewriters, valued at \$296,105, in November and during the 11 months took 56,753, valued at \$3,040,734. France took 2808 typewriters, valued at \$162,532, in November and during the 11 months exports of typewriters to that country totaled 28,118, valued at \$1,661,355.

Australia took 31 printing presses, valued at \$99,524, in November and during the 11 months took 170, valued at \$508,535. The United Kingdom took 27 printing presses, valued at \$39,746, in November and during the 11 months took 487, valued at \$962,785. France was by far the greatest market for American harvesters and binders during the 11-month period, taking 10,063, valued at \$1,652,364, although no shipments were made to that country during November. Spain was the leading country of export of these implements in November, taking 80, valued at \$21,564. For the 11 months Spain took 552 harvesters and binders, valued at \$102,195.

United States Exports and Imports of Machinery

	Exports of Machinery	Imports of Machinery	Exports of Metal- Working Machinery
1924			
October	\$28,094,797	\$604,226	\$834,806
November	25,502,430	1,354,600	715,327
December	22,796,442	643,318	867,616
The year	317,034,987	9,711,571	8,644,444
1925			
January	28,117,952	803,829	845,986
February	23,215,776	814,703	707,445
March	35,962,076	999,237	1,364,930
April	36,033,980	1,167,099	1,245,634
May	32,164,865	861,655	1,230,914
June	28,746,061	935,487	1,003,325
Fiscal year....	338,715,075	10,404,337	10,776,079
July	32,320,533	905,872	1,188,069
August	38,768,823	747,912	1,308,372
September	30,719,342	956,250	989,379
October	31,271,007	996,557	905,826
November	30,084,814	876,113	1,007,376
Eleven months.	347,442,949	8,687,378	11,797,256

Imports of Machinery Into the United States

	Eleven Months Ended November			
	(By Value)			
	November 1925	1924	1925	1924
Metal - working ma- chine tools	\$37,010	\$29,689	\$347,772	\$317,045
Agricultural machin- ery and imple- ments	183,506	147,316	2,871,449	2,139,330
Electrical machinery and apparatus ...	119,220	743,749	864,891	1,117,917
Other power gener- ating machinery...	2,361	5,246	21,130	89,997
Other machinery... Vehicles, except agri- cultural	534,016	318,149	4,367,782	3,687,628
Total	\$876,113	\$1,354,600	\$8,687,378	\$9,068,374

United States Metal-Working Machinery Exports

	November, 1925		October, 1925	
	No.	Value	No.	Value
Lathes	142	\$317,297	90	\$113,864
Boring and drilling ma- chines	69	22,921	124	29,466
Planers, shapers and slotters	21	39,076	25	31,409
Bending and power presses	35	40,535	24	16,052
Gear cutters	38	56,949	29	74,109
Milling machines	96	164,138	69	103,328
Thread-cutting and screw machines	56	87,763	99	167,094
Punching and shearing machines	9	4,125	17	11,658
Power hammers	19	17,254	13	9,393
Sharpening and grinding machines	91	155,923	80	206,035
Chucks, center, lathes, drill and other metal- working tools	921	15,963	1,286	26,976
Pneumatic portable tools.	967	85,432	1,457	116,832
Total	2,464	\$1,007,376	3,313	\$905,826

Machinery Exports from the United States

	November, 1925	November, 1924	Eleven Months Ended November, 1925	November, 1924
Locomotives	\$1,027,702	\$485,820	\$6,309,263	\$5,068,818
Other Steam Engines	70,148	40,142	809,092	946,417
Boilers	128,536	120,075	1,811,605	1,822,317
Accessories and Parts	165,268	144,530	1,937,398	3,450,471
Automobile Engines	523,048	419,905	14,295,872	3,164,312
Other Internal Combustion Engines	910,855	741,895	8,007,852	6,049,321
Accessories and Parts for Electric Locomotives	305,138	228,636	3,757,758	3,278,657
Other Electric Machinery and Apparatus	205,055	14,440	685,535	2,200,185
Excavating Machinery	563,993	565,676	6,307,021	7,299,501
Concrete Mixers	437,543	211,738	3,721,991	2,202,692
Road Making Machinery	55,121	41,740	712,533	591,358
Elevators and Elevator Ma- chinery	75,296	68,112	1,293,506	1,123,798
Mining and Quarrying Ma- chinery	216,599	140,630	2,062,825	1,797,734
Oil Well Machinery	1,123,301	742,708	9,474,376	4,219,108
Pumps	1,182,365	476,940	8,930,041	6,049,340
Lathes	680,800	622,089	6,838,494	6,729,948
Boring and Drilling Machines	317,297	149,630	2,270,199	1,102,025
Planers, Sharers and Slotters	22,921	31,218	585,589	532,468
Bending and Power Presses	39,076	34,381	533,619	288,514
Gear Cutters	40,535	44,672	536,348	461,446
Milling Machines	56,949	74,728	783,752	376,482
Thread Cutting and Screw Machines	164,138	57,937	1,522,575	532,787
Punching and Shearing Ma- chines	87,763	52,707	1,092,017	526,027
Power Hammers	4,125	20,069	181,600	96,174
Sharpening and Grinding Ma- chines	17,254	27,813	218,388	235,990
Other Metal Working Ma- chinery and Parts of	155,923	124,123	2,859,223	1,619,879
Textile Machinery	437,246	339,077	4,965,132	3,837,659
Sewing Machines	915,971	670,971	10,089,932	7,962,321
Shoe Machinery	537,625	584,982	7,906,125	7,752,128
Flour-Mill and Gristmill Ma- chinery	68,035	153,982	1,235,443	1,335,813
Sugar-mill Machinery	61,915	53,234	800,603	727,665
Paper and Pulp Mill Ma- chinery	1,212,074	994,385	7,576,281	8,040,844
Sawmill Machinery	118,159	164,049	1,483,285	1,952,609
Other Woodworking Machinery and Implements	54,603	95,302	715,940	573,147
Refrigerating and Ice Making Machinery	124,302	110,063	1,246,420	1,198,075
Air Compressors	262,545	120,284	2,127,440	2,001,504
Typewriters	254,787	198,439	2,570,551	2,700,166
Power Laundry Machinery	1,448,056	1,148,830	16,199,805	13,848,244
Type-setting Machines	37,319	83,204	880,045	927,274
Printing Presses	249,430	561,713	3,089,140	3,296,393
Agricultural Machinery and Implements	316,862	636,506	4,156,801	4,229,487
All Other Machinery and Parts	10,791,637	9,386,163	122,706,235	114,766,274
Total	\$30,084,814	\$25,512,398	\$347,442,949	\$294,245,820

British Consumers Buy in France

German, Italian and British Mills Complain of
French Competition—More Syndicates in Formation

(By Cablegram)

LONDON, ENGLAND, Dec. 28.

THE year closes with an improved tone in the market and a better outlook for iron and steel. Cleveland pig iron is strong and minimum prices have been advanced 2s., with domestic consumers displaying considerable interest but export demand still sluggish. Hematite activity continues, with prices showing an upward tendency and prompt supplies unobtainable.

Foreign ore is quiet. Bilbao Rubio is quoted at 21s. to 21s. 3d., c.i.f. Tees.

Domestic demand for finished steel, especially for engineering and structural steel requirements, has improved, with a fair number of contracts placed, but new shipbuilding contracts and export orders are still scarce.

Tin plate is quiet but prices are steady. Moderate activity in galvanized sheets has permitted makers to begin the year with well filled order books. Black sheets, however, are quiet.

Continental markets are firm, with British consumers active buyers, and restriction of output contributing to extended deliveries. The French Rail Syndicate will control production and prices of rails, effective Jan. 1. Creation of the Ruhr Steel Trust is reported imminent. On Nov. 30 there were 93 furnaces in blast in Germany. The German Raw Steel association will maintain its January output at 65 per cent of capacity. Italian producers are reported pressing for protection against French competition and the Government has promised an investigation.

DEPRESSION IN GERMANY

Mills Aroused to Combat French "Exchange Dumping"—Syndicates Believed Essential to Stability

BERLIN, GERMANY, Dec. 14.—Better buying by European customers is expected early in the year, but it is doubtful whether German mills will benefit by such improvement, as long as the French currency continues unstable. In the past year Germany recovered the pre-war position as second largest producer of iron and steel (second only to the United States) but the European markets are still largely controlled by French and Belgian makers. Prior to the war, Germany was Europe's lowest priced iron and steel producing country, particularly for standard products, but today German products are undersold by countries

whose depreciated exchanges reduce all the determining factors in production cost. While these producers can, as a result, sell cheaply at a profit, German makers take a loss when they attempt to under quote to hold customers. In the past few weeks French competition has been sharper than ever, particularly in the export of pipes and tubing. German steel men claim that French makers are artificially stimulating sales in order to raise their total to a level which would justify the demand for a larger participation quota in the syndicate, formation of which is under negotiation. In October, the last reported month, French production of iron and steel shows considerable increases.

Syndicates Believed Necessary

The conviction that disastrous competition can only be eliminated by mergers and syndicates is stronger than ever and when it was reported recently that the

British and Continental European prices per gross ton, except where otherwise stated. f.o.b. makers' works, with American equivalent figured at \$4.85 per £, as follows:

Durham coke, del'd... £1 1½s to £1 2s.	\$5.19 to \$5.32
Bilbao Rubio oref... 1 0½	4.97
Cleveland No. 1 fdy. 3 11 and 3 11½*	17.21 and 17.33*
Cleveland No. 3 fdy. 3 6	16.00
Cleveland No. 4 fdy. 3 7½ and 3 8*	16.37 and 16.49*
Cleveland No. 4 forge 3 7 and 3 7½*	16.24 and 16.37*
Cleveland basic... 3 8 and 3 8½*	16.49 and 16.62*
East Coast mixed... 3 15½ to 3 16	18.29 to 18.40
East Coast hematite. 4 19	24.00
Ferromanganese... 15 10	75.18
*Ferromanganese... 15 5	73.96
Rails, 60 lb. and up.. 7 10 to 8 0	36.37 to 38.80
Billets... 6 0 to 7 10	29.10 to 36.37
Sheets and tin plate bars, Welsh... 6 5	30.31
Tin plates, base box... 0 19½ to 1 0	4.72 to 4.90
	C. per Lb.
Ship plates... 7 5 to 7 15	1.57 to 1.67
Boiler plates... 11 0 to 11 10	2.56 to 2.67
Tees... 7 7½ to 7 17½	1.59 to 1.69
Channels... 6 12½ to 7 2½	1.43 to 1.54
Beams... 6 7½ to 6 17½	1.38 to 1.48
Round bars, % to 3 in. 7 17½ to 8 7½	1.67 to 1.81
Steel hoops... 10 10 and 11 0*	2.27 and 2.35*
Black sheets, 24 gage 11 5 to 11 10	2.44 to 2.67
Black sheets, Japanese specifications... 15 5	3.30
Galv. sheets, 24 gage. 16 10	3.57 to 3.61
Cold rolled steel strip, 20 gage... 18 0	3.90

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

Foundry pig iron:(a)	
Belgium	£2 19s. to £3 1s. \$14.30 to \$14.80
France	2 19 to 3 1 14.30 to 14.80
Luxemburg	2 19 to 3 1 14.30 to 14.80
Basic pig iron:(a)	
Belgium	2 18 to 3 0 14.05 to 14.55
France	2 18 to 3 0 14.05 to 14.55
Luxemburg	2 18 to 3 0 14.05 to 14.55
Coke	0 18 4.37
Billets:	
Belgium	4 9½ to 4 11½ 21.70 to 22.18
France	4 9½ to 4 11½ 21.70 to 22.18
Merchant bars:	C. per Lb.
Belgium	5 7 to 5 8 1.16 to 1.17
Luxemburg	5 7 to 5 8 1.16 to 1.17
France	5 7 to 5 8 1.16 to 1.17
Joists (beams):	
Belgium	5 0 to 5 2½ 1.08 to 1.10
Luxemburg	5 0 to 5 2½ 1.08 to 1.10
France	5 0 to 5 2½ 1.08 to 1.10
Angles:	
Belgium	5 2 to 5 4 1.12 to 1.14
½-in. plates:	
Belgium	6 5 to 6 7½ 1.35 to 1.37
Germany	6 5 to 6 7½ 1.35 to 1.37
¾-in. ship plates:	
Belgium	5 10 to 5 12½ 1.19 to 1.20
Luxemburg	5 10 to 5 12½ 1.19 to 1.20
Sheets, heavy:	
Belgium	6 3 to 6 4 1.33 to 1.34
Germany	6 3 to 6 4 1.33 to 1.34

(a) Nominal.

negotiations for formation of the Western Steel Trust had definitely failed there was a severe drop in steel securities. The report, however, was premature, as negotiations have been resumed on a new basis, after serious difficulties were encountered in fixing the participation quotas of the various companies.

The long negotiated wire syndicate has finally been established for a term of five years. The recently formed wire rod syndicate embraces 96 per cent of the total German output. Membership in the Raw Steel Syndicate has lately increased and a number of consumers have undertaken to satisfy their requirements exclusively through the syndicate. Negotiations for an international tube syndicate continue. A late development in the Franco-German negotiations for a general steel agreement was a public statement by the French Comité des Forges implying that German mills aimed at dictatorial control, which French makers would not accept. German steel men deny this and claim that French mills desire to retain permanently the domination of markets gained as a result of the depreciated franc. There are evidently only small prospects of the successful formation of a steel producing syndicate embracing all important European producing countries.

Orders Are for Prompt Shipment

The steel syndicate has retained the 35 per cent reduction of output for December, which has been in force in preceding months. The shortage of capital is causing serious difficulties, manufacturing consumers of iron and steel not being able to purchase more stock than is required for immediate consumption, which, as a result keeps deliveries on a prompt shipment basis. In some instances mills with insufficient tonnage for full operation are forced to refuse orders because of prompt deliveries specified. While French producers are also offering extended deliveries they are, as a rule, heavily booked with tonnage.

While there is a slight improvement reported in demand for semi-finished products, the money shortage and intense cold have combined to curtail building more than usual and the demand for finished products such as bars and shapes is exceedingly small. A considerable tonnage of bars, not controlled by the steel syndicate, are being offered and sales have been made as low as 128 m. (1.38c. per lb.) per metric ton, compared with the syndicate price of 134.30 m. (1.45c. per lb.) per ton. The sheet consuming industries are de-

pressed and demand has declined to such an extent as to permit of delivery terms of one to two weeks with small tonnages shipped immediately from stock.

Exchange Dumping to Be Combatted

At a recent monthly meeting of the Pig Iron Syndicate the statement was made that sales have been 30 per cent lower than in October. French pig iron, which until recently was competitive only in the South German market, is now being sold throughout western Germany. Only a few mines in the Siegerland, Dill and Lahn sections are being operated and much of this small production is being piled at the mines. The recent decline of the French franc has revived buying of minette ores.

The light hardware market is unsatisfactory and with increasing unemployment and a minimum volume of inquiry, manufacturers are making deep cuts in prices to secure ready cash. Locomotive builders are operating at about 2 per cent of the pre-war rate of production and the statement has been made that export markets for locomotives cannot be held against the competition of American builders. The high grade steel industry of Solingen is suffering intensely by the British tariff of 33 1/3 per cent, which has cut off a market which the Solingen manufacturers have been supplying with low-quality cheap products not made in Sheffield.

Export prices of most products are lower than domestic but in most instances are a few marks per ton higher than French quotations. As a result of what the German syndicates term "exchange dumping" by the French, and the fact that there are at present no general international price agreements, German makers are meeting each prospective order on a new price basis, even at a loss if necessary, to obtain a desirable contract. Consequently it is extremely difficult to determine present export prices. The last general meeting of the Pig Iron Syndicate authorized members to meet French competition with any prices considered necessary. In government circles there is a strong movement favoring the establishment of import duties directed against low exchange countries such as France, Belgium and Poland.

The Stinnes liquidation has not yet been completed. About 30,000,000 marks of debts are still to be paid, so that it is expected that six months to a year more will be required for complete settlement.

President Campbell Looks for Splendid Six Months' Business

YOUNGSTOWN, Dec. 29.—James A. Campbell, president of the Youngstown Sheet & Tube Co., predicts "splendid business for the first six months of 1926, not only for the steel industry, but generally." "I can see no clouds on the business horizon," he states.

"Prices have been stiffening and will be higher," he says. "I look for somewhat higher production costs. Our products have been sold at a very narrow margin of profit and we expect to secure higher prices in several lines, which will certainly include plates, shapes, bars, nails, wire and galvanized sheets."

"Specifications up to Dec. 17 were higher than those for the preceding month and shipments were also ahead. As a whole 1925 was a good year for us and I am highly gratified over the results. Oil country business is better. Crude oil prices are advancing, and this means better business in larger pipe, which had fallen off recently. While wire and nail business is quiet at present, due to the seasonal slackening of building activities in the Northern area, by Feb. 1 jobbers will buy to replenish stocks."

"The farmer is in better shape financially and evidences taken throughout the West show that the large pig iron melt in that section of the country is largely due to the increased activities of farm implement makers."

"With the country working, and of course prosperous, the automobile industry is expected to establish

new production records. I am rather surprised at the large specifications coming at this time from the automobile industry."

"The volume of business at the moment is good and will probably remain the same until about Jan. 15 or a little later. Specifications in the next four weeks will be held up to a limited extent, causing a slower period. Better volume of business will come after Jan. 15. This slowing up will be due to inventory taking and holiday seasonal effect. Another reason for a quieter spell will be that many consumers bought in excess of their last quarter needs because prices for first quarter were advanced. This overhang, however, will soon disappear."

Commerce Through Canals at Sault Ste. Marie

November movement of freight through the canals at Sault Ste. Marie is reported by the United States Engineers office to have amounted to 8,408,940 net tons, of which 97.7 per cent went through the American canal. Eastbound freight accounted for 83 per cent of the tonnage and iron ore accounted for 62 per cent of the eastbound freight, being placed at 4,267,806 net tons.

Associated Press dispatches call 1925 "the greatest season in the history of shipping on the Great Lakes, with an approximate total tonnage of 98,000,000 due largely to better conditions in the steel industry."

Iron and Steel Markets

Year Ends with High Operating Pace

Backlogs Generally Heavier Than a Year Ago—Promise of Several Months of Sustained Activity—Prices Show Consumption Is Balancing Production

NINETEEN HUNDRED TWENTY-FIVE closes with the steel industry producing at a high rate, backed by a volume of orders exceeding those of a year ago. Prospects are considered bright for a continued high pace of operations for several months. And 1925 will beat the 1917 war record of ingot output of 43,619,000 tons by a few hundred thousand tons, estimating December at as much as 5 per cent under November, to allow for holiday suspension and the following cold weather. No general shut-down over New Year's Day is planned.

The buyer complacency over supplies has not changed. The relatively few price changes in recent weeks point to a balance between consumption and production. Manufacturers are not committed so far ahead nor fully enough to be freed from dependence upon new business, and there is also the continued good railroad service.

There is no sign that advances will be used to stimulate business. Seeing that prices are fully \$2 a ton lower than last January, the trade is not looking for a repetition of the hesitation and price weakness which occurred last spring.

Added evidence of the surprising vigor of the automobile industry, resulting in upward revising of schedules of sheet mills and casting makers, postpones any concern over the extent of railroad and farmer buying. These were counted on to fill any gaps left by reduced automobile and building construction demand, but at present are adding to the general total.

At the very time that imminence of the anthracite coal strike settlement was likely to make for easing coke prices, cold weather brought a fresh demand for crushed coke for heating purposes, with sales at \$9, Connellsville, and a shortage of blast furnace fuel for prompt shipment advanced that grade 50c. a ton to \$5.50.

Three blast furnaces have gone in blast within the week, a McKinney Steel Co. stack at Cleveland, one of the Rogers-Brown Iron Co. at Buffalo and a Port Henry, N. Y., furnace. The Youngstown Sheet & Tube Co. will blow in a Hubbard, Ohio, furnace this week and an Ashland stack of the American Rolling Mill Co. goes in Jan. 1.

Merchant furnaces are having less competition from steel companies, owing to the high rate of steel production, and this, together with the fact that most of the furnaces have well-filled order books for first quarter, is helping to maintain prices. Jackson County silvery iron and Bessemer ferrosilicon will be advanced \$1 a ton on Jan. 1.

Of the 65,000 freight cars bought this year, approximately 40,000 were ordered since Aug. 1, and thus there is a carry-over to 1926. The Baltimore & Ohio, which recently ordered 2000 box cars, may now buy 1000 or 2000 steel hopper cars. The Pennsylvania Railroad is out for its first quarter steel requirements.

Rails bought thus far for 1926 are estimated in excess of the large total placed a year ago. Shipments are already being called for at Chicago, which may mean some good secondary orders in the spring. A mill there booked in the week 8000 tons of rails for several roads, and 12,000 tons of angle bars, 37,000 kegs of spikes and bolts and 3000 tons of tie plates were among the purchases.

In finished steel the year end was occupied generally in putting through specifications against contracts to forestall cancellations or to secure early deliveries for restocking after inventory. Wire, including nails, was conspicuously quiet, with \$2.60 named on nails against the more general \$2.65. Some low-priced sheets were marketed by jobbers.

A seasonal let-down in structural steel awards is shown by the week's total of 21,000 tons, yet this December will show a larger amount of such work than usual. Specifications for plain material received in Chicago have been exceeded but once since January, covering requirements of railroad car builders as well as building constructors.

Gas companies in New York, Brooklyn and Boston added 20,000 tons to the heavy cast iron pipe business of recent weeks.

Ferromanganese from India to the amount of 1250 tons came in at Philadelphia last week.

Pig iron imports at Boston this year will total 90,521 tons, largely Indian and Continental iron. The total for the country will be well over 400,000 tons.

No change has occurred this week in either of THE IRON AGE composite prices. That for pig iron stands at \$21.54 for the fifth week; that for finished steel, at 2.453c. per lb. for the fourth week. One year ago both were higher by 3 or 4 per cent.

Pittsburgh

Outlook for a Steady Steel Market—Coke Advances

PITTSBURGH, Dec. 28.—Steel manufacturers continue to report that inventory considerations are having some effect upon shipments, but also that the decline is much less than usual. New buying is small because there are few consumers of steel who have not protected themselves against a considerable part of their first quarter requirements, and specifications against these orders are all that could be expected at this season. Producers of most lines of finished steel have live business that will take up their production for January and as the present productive rate is averaging at least 85 per cent of capacity, a clear picture of consumption is provided. There is, indeed, a very nice balance between consumption and production, which probably accounts for the absence of price changes in the past few weeks. Buyers do not seem to be showing any undue

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 28, 1925	Dec. 22, 1925	Dec. 1, 1925	Dec. 29, 1924	Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 28, 1925	Dec. 22, 1925	Dec. 1, 1925	Dec. 29, 1924
No. 2X, Philadelphia†	\$24.26	\$24.26	\$24.26	\$25.01	Sheets, black, No. 28, Pbg.	3.35	3.35	3.25	3.60
No. 2, Valley furnace†	20.50	20.50	20.50	22.00	Sheets, black, No. 28, Chicago dist. mill.	3.45	3.45	3.45	3.70
No. 2, Southern, Cin'tif†	25.69	25.69	24.69	24.05	Sheets, galv., No. 28, Pbg.	4.60	4.60	4.60	4.75
No. 2, Birmingham, Ala.†	22.00	22.00	22.00	20.00	Sheets, galv., No. 28, Chicago dist. mill.	4.70	4.70	4.70	4.85
No. 2 foundry, Ch'go furn. *	23.00	23.00	23.00	23.50	Sheets, blue, 9 & 10, Pbg.	2.50	2.50	2.50	2.70
Basic, del'd, eastern Pa. .	23.00	23.00	23.00	23.50	Sheets, blue, 9 & 10, Chicago dist. mill.	2.60	2.60	2.60	2.80
Basic, Valley furnace. .	20.00	20.00	20.00	21.50	Wire nails, Pittsburgh.	2.65	2.65	2.65	2.85
Valley Bessemer del'd Pbg.	22.76	22.76	22.76	24.26	Wire nails, Chicago dist. mill.	2.70	2.70	2.70	2.95
Malleable, Chicago furn. *	23.00	23.00	23.00	23.50	Plain wire, Pittsburgh.	2.50	2.50	2.50	2.60
Malleable, Valley	20.50	20.50	20.50	22.00	Plain wire, Chicago dist. mill.	2.55	2.55	2.55	2.70
Gray forge, Pittsburgh. .	21.76	21.76	21.76	23.26	Barbed wire, galv., Pbg.	3.35	3.35	3.35	3.55
L. S. charcoal, Chicago. .	29.04	29.04	29.04	29.04	Barbed wire, galv., Chicago dist. mill.	3.40	3.40	3.40	3.65
Ferromanganese, furnace .	115.00	115.00	115.00	110.00	Tin plate, 100 lb. box, Pbg.	\$5.50	\$5.50	\$5.50	\$5.50
Rails, Billets, etc., Per Gross Ton:									
O.-h. rails, heavy, at mill. .	\$43.00	\$43.00	\$43.00	\$43.00					
Bess. billets, Pittsburgh. .	35.00	35.00	35.00	37.00					
O.-h. billets, Pittsburgh. .	35.00	35.00	35.00	37.00					
O.-h. sheet bars, Pittsburgh	36.00	36.00	36.00	38.00					
Forging billets, base, Pbg. .	40.00	40.00	40.00	42.50					
O.-h. billets, Philadelphia. .	41.30	40.30	40.30	41.67					
Wire rods, Pittsburgh. . .	45.00	45.00	45.00	48.00					
Cents Cents Cents Cents									
Skelp, gr. steel, Pbg., lb. .	1.90	1.90	1.90	2.00					
Light rails at mill. . . .	1.65	1.65	1.65	1.80					
Finished Iron and Steel,									
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents					
Iron bars, Philadelphia . .	2.22	2.22	2.22	2.32					
Iron bars, Chicago	2.00	2.00	2.00	2.00					
Steel bars, Pittsburgh . .	2.00	2.00	2.00	2.10					
Steel bars, Chicago	2.10	2.10	2.10	2.10					
Steel bars, New York . . .	2.34	2.34	2.34	2.44					
Tank plates, Pittsburgh. .	1.90	1.90	1.90	2.00					
Tank plates, Chicago . . .	2.10	2.10	2.10	2.20					
Tank plates, New York . .	2.00	2.04	1.94	2.34					
Beams, Pittsburgh	1.90	1.90	1.90	2.10					
Beams, Chicago	2.10	2.10	2.10	2.20					
Beams, New York	2.24	2.24	2.24	2.34					
Steel hoops, Pittsburgh. .	2.50	2.50	2.50	2.50					
*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.									
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.									

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

THE IRON AGE Composite Prices

Finished Steel

Dec. 28, 1925, 2.453c. Per Lb.

One week ago.....	2.453c.
One month ago.....	2.439c.
One year ago.....	2.560c.
10-year pre-war average.....	1.689c.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

High

1925	2.560c.	Jan. 6	2.396c.	Aug. 18
1924	2.789c.	Jan. 15	2.460c.	Oct. 14
1923	2.824c.	April 24	2.446c.	Jan. 2

Low

Pig Iron

Dec. 28, 1925, \$21.54 Per Gross Ton

One week ago.....	\$21.54
One month ago.....	21.54
One year ago.....	22.17
10-year pre-war average.....	16.72

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

High

1925	\$22.50.	Jan. 13	\$18.96.	July 7
1924	22.88.	Feb. 26	19.21.	Nov. 3
1923	30.86.	March 20	20.77.	Nov. 20

Low

Present conditions are satisfactory and are based on entirely natural factors.

All signs indicate that the end of the anthracite strike is not very far off, but this possibility has had no effect as yet upon the beehive oven coke market. Actually there seems to be some shortage of blast furnace fuel for prompt shipment, and prices maintain their recent strength. Pig iron is holding firm in price without the assistance of an active demand. Consumers are taking out the iron they bought, however, and most merchant producers continue to reduce their yard stocks. Since higher prices do not appear to be likely in the near future, the willingness of consumers to take iron is regarded as indicative of a good rate of consumption. There is more interest in scrap on the

anxiety about their future requirements, and manufacturers are not committed so far ahead nor fully enough to be freed from dependence upon new business. The railroads continue to give good service and there is therefore not the necessity for large stocks in second hands there was when the situation was different in this respect.

There is no sign that the manufacturers are going to try to stimulate business by advancing prices. Capacity is large and it would be necessary to take a good deal of business at low prices before making an advance. Mills found that such a move a year ago was a failure, because when they could not maintain the advances they could not stop prices from sinking below the levels from which the advance was made.

part of the steel makers than recently, and the expectation of liberal purchases in the near future is having some effect upon sellers' ideas on prices.

Pig Iron.—Buying of pig iron in this market is on a very moderate scale. The demand, as for several weeks past, is coming chiefly from the small consumers and only in few cases does the individual sale amount to more than 100 tons. There is no weakening in prices, however, because producers are already fairly well obligated against their probable production over the first few months of the new year, and it is also the general opinion that if there is to be a fair profit in making pig iron, prices should hold at present levels. Merchant producers at present are having no steel company competition and feel that so long as this condition rules they should be able to maintain present prices even in the face of a light demand. Low prices of pig iron in the past year are now charged to unnecessary competition. Another factor bearing on pig iron prices is the possibility that ore prices for 1926 will move up materially from this year's prices. It is said that stocks above the ground at the mines have been cleaned up. The Youngstown Sheet & Tube Co. will blow in one of its Hubbard, Ohio, furnaces soon, but the Reliance Coke & Furnace Co. is said to be considering banking of its Claire furnace, Sharpsville, Pa.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$20.00
Bessemer	21.00
Gray forge	20.00
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.50
Low phosphorus, copper free	\$28.00 to 28.60

Ferroalloys.—Prices are holding well, although real activity is lacking. There has been the usual amount of contracting for spiegeleisen and high grade ferrosilicon, and business in those alloys is largely a matter of specification. The larger users of ferromanganese also appear to have protection against their requirements for several months. Consequently, such demands as now are developing are chiefly from those users who buy frequently in small lots. Prices are given on page 1829.

Semi-Finished Steel.—This market is very firm, because producers, having given their regular customers full protection against their first quarter requirements, cannot now figure on having much steel to sell after allowing for contract tonnages and their own needs. Most makers now want \$36, Pittsburgh or Youngstown, on large billets and slabs and \$37 for sheet bars and small billets and slabs on any additional first quarter business they might now book, but badly as some non-integrated manufacturers seem to want additional protection against the requirements of that period, they balk at paying the prices asked, which are \$1 a ton above the regular contract levels. Moreover, special circumstances surrounded sales at higher prices than \$35 for large billets and slabs and \$36 for sheet bars. So far as prices are concerned, the only real development traceable to the sold-up condition of makers is that they have been able to get higher prices for stocked steel than otherwise might have been obtainable. Manufacturers who buy their steel seem to believe they conceded something in paying \$35 for billets and \$36 for sheet bars for first quarter tonnages and consequently are resisting higher prices on supplementary purchases. First quarter tonnages of forging quality billets and blooms in this district generally carry \$41, base, as against \$40, the fourth quarter price. Efforts to obtain more than \$45, base, for wire rods, are not successful. Prices are given on page 1829.

Steel and Iron Bars.—Makers of steel bars have considerable first quarter business on their books, but are not so heavily committed as to be independent of new business and the effort to get more 2c. base, Pittsburgh, cannot be forced. There is high operation of bar mill capacity in this and nearby districts, indicating good specifications and good consumption. Bar iron prices are steady with an even demand. Prices are given on page 1827.

Structural Steel.—Mills in this district have not had

much success in getting the market above 1.90c., base Pittsburgh, for large structural shapes in worthwhile tonnages. Higher prices are confined strictly to the small lots that usually sell at some advance over large-lot quotations. There has been a large volume of structural steel business in the past year and the common report is that there is much pending that will be closed a little later, but demands do not put any strain on productive capacity and delivery demands are not so urgent that they cannot be easily met. Recalling the experiences of a year ago, the mills are slow to push prices above levels at which sales are easily made and which can be maintained. Prices are given on page 1827.

Plates.—Prices higher than 1.90c., base Pittsburgh, continue to be more of a hope than a realization. That price is being done on some fairly sizable orders, and it is satisfactory to manufacturers whose costs are low enough to show a margin of profit. The attitude of producers is that it is a happier condition to operate steadily on a narrow margin of profit, than to seek prices that would produce a larger return, but might interfere with sales. The country still is "long" of plate mill capacity, even though there is some which cannot be operated profitably on a market under 2c. base. A local fabricator is low bidder on 12 steel barges for the Inland Waterways Corporation, taking about 500 tons of steel. Prices are given on page 1827.

Wire Products.—Business is experiencing the lull common to the time of year, but orders covering the early part of the new year are coming along steadily and, with the completion of stock-taking, a material increase in specifications is expected. Mill operations are higher than present demands warrant, but all signs point to a good spring business and the manufacturers are preparing for it. Prices are holding well. They are given on page 1827.

Rails and Track Supplies.—Makers of standard rails are well supplied with business, and producers of track accessories are steadily building up first quarter order books. The coming year gives every promise of being a good one in rail laying, and mill operations are aided by the fact that most railroads now take a portion of their purchases during the winter, instead of waiting until the weather is favorable for the work. Light rails are moving fairly well. A lighter demand seems likely from the soft coal districts if, as seems probable, the hard coal suspension soon will end, but there should be a compensating demand from the anthracite mines. Prices do not change. They are given on page 1827.

Tubular Goods.—This branch of the industry still is experiencing quiet times, although it is commented upon that standard pipe is selling well for the time of year. Even when the market is fairly active there is some price irregularity and now, with demands putting no severe tax upon productive capacity, it is natural that reports suggest fairly frequent concessions. There may not always be a quotable difference in prices in dull and active times, but there is a difference in the attitude of mills toward business. The boiler tube market is still unsatisfactory to makers, as there is by no means enough business to engage capacity and competition for passing orders still is sharp. Discounts are given on page 1827.

Sheets.—Business has suffered from observance of the holidays and inventory consideration, but practically all makers are well provided with specifications for January shipment and are not disturbed by the present lull. There will not be as general a suspension over the New Year holiday as there was at Christmas but it is probable that an absence of men will make it difficult for some mills to run on Saturday. Deviations from quoted prices are not unknown but they are neither frequent nor general. The trend of automobile demand toward closed cars and all steel bodies is counted on to provide a considerable extra tonnage of sheets in 1926. In replacing wood 16-gage steel is commonly used in angles and special shapes and it is estimated that the building of the upper frame of steel will take from 75 to 400 lb., according to the size of the car,

Prices of Finished Iron and Steel Products (Carload Lots)

Iron and Steel, Bars

Soft Steel

	Base Per Lb.
F.o.b. P'gh mills.....	2.00c. to 2.10c.
F.o.b. Chicago.....	2.10c.
Del'd Philadelphia.....	2.32c. to 2.42c.
Del'd New York.....	2.34c. to 2.44c.
Del'd Cleveland.....	2.19c.
F.o.b. Birmingham.....	2.15c. to 2.25c.
C.i.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.40c.

Billet Steel Reinforcing

	Base Per Lb.
F.o.b. Pittsburgh mills.....	2.00c. to 2.10c.

Rail Steel

	Base Per Lb.
F.o.b. mill.....	1.80c. to 1.90c.
F.o.b. Chicago.....	2.00c. to 2.10c.

Iron

	Base Per Lb.
Common iron, f.o.b. Chicago.....	2.00c.
Refined iron, f.o.b. P'gh mills.....	2.00c.
Common iron, del'd Phila'phia.....	2.22c.
Common iron, del'd New York.....	2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.00c.
F.o.b. Chicago.....	2.10c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
Del'd Cleveland.....	1.99c. to 2.09c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.i.f. Pacific ports.....	2.30c. to 2.35c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 2.10c.
F.o.b. Chicago.....	2.10c.
F.o.b. Birmingham.....	2.05c. to 2.15c.
Del'd Cleveland.....	1.99c. to 2.09c.
Del'd Philadelphia.....	2.07c. to 2.12c.
Del'd New York.....	2.09c. to 2.14c.
C.i.f. Pacific ports.....	2.30c. to 2.40c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh.....	2.50c.
All gages, 6 in. and wider, P'gh.....	2.30c.
All gages, 6 in. and narrower, Chicago.....	2.60c.
All gages, wider than 6 in., Chicago.....	2.50c.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. P'gh mills.....	2.50c.
Bars, f.o.b. Chicago.....	2.50c.
Bars, Cleveland.....	2.50c.
Shafting, ground, f.o.b. mill.....	2.70c. to 3.00c.
Strips, f.o.b. P'gh mills.....	3.90c.
Strips, f.o.b. Cleveland mills.....	3.90c.
Strips, delivered Chicago.....	4.20c.
Strips, f.o.b. Worcester mills.....	4.05c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails.....	\$2.65
Galv'd nails, 1-in. and longer.....	4.65
Galv'd nails, shorter than 1 in.....	4.90
Galv'd staples.....	3.35
Polished staples.....	3.10
Cement coated nails, base, per count keg.....	1.85

Base Per 100 Lb.

	Base Per 100 Lb.
Bright plain wire, No. 9 gage.....	33.50
Annealed fence wire.....	2.65
Spring wire.....	3.50
Galv'd wire, No. 9.....	3.10
Barbed wire, galv'd.....	3.25
Barbed wire, painted.....	3.10

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant, and Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh.....	\$65.00
F.o.b. Cleveland.....	65.00
F.o.b. Anderson, Ind.....	65.00
F.o.b. Chicago district mills.....	67.00
F.o.b. Duluth.....	68.00
F.o.b. Birmingham.....	68.00

Sheets

Blue Annealed

Base Per Lb.

Nos. 9 and 10, f.o.b. Pittsburgh.....	2.50c.
Nos. 9 and 10, f.o.b. Ch'go dist. mills.....	2.60c.
Nos. 9 and 10, del'd Phila'phia.....	2.72c. to 2.82c.

Box Annealed, One Pass Cold Rolled

No. 28, f.o.b. Pittsburgh.....	3.35c.
No. 28, f.o.b. Ch'go dist. mill.....	3.45c.
No. 28, del'd Phila'phia.....	3.57c. to 3.67c.

Galvanized

No. 28, f.o.b. Pittsburgh.....	4.60c.
No. 28, f.o.b. Chicago dist. mill.....	4.70c.
No. 28, del'd Phila'phia.....	4.82c. to 4.92c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.35c.
No. 28, f.o.b. Chicago dist. mill.....	3.45c.

Automobile Body Sheets

No. 22, f.o.b. Pittsburgh.....	4.50c.
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Long Ternes

No. 28, 8-lb. coating, f.o.b. mill.....	4.85c.
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Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.....	5.60

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series	Base Per 100 Lb.
Numbers	Carbon) 2100* (1% Nickel, 0.10% to 0.20%
2300 (3/4% Nickel).....	4.60 to 4.70
2500 (5% Nickel).....	5.50 to 5.90
3100 (Nickel Chromium).....	5.60 to 5.70
3200 (Nickel Chromium).....	5.25 to 5.35
3300 (Nickel Chromium).....	7.25 to 7.35
3400 (Nickel Chromium).....	6.50 to 6.60
5100 (Chromium Steel).....	3.60
5200* (Chromium Steel).....	7.50 to 8.25
6100 (Chrom. Vanadium bars).....	4.30 to 4.40
6100 (Chrom. Vanad. spring steel).....	3.85
9250 (Silicon Manganese spring steel).....	3.25 to 3.30

Carbon Vanadium (0.45% to 0.55%)

Carbon, 0.15% Vanad.).....

Nickel Chrome Vanadium (0.60

Nickel, 0.50 Chrom., 0.15 Vanad.).....

Chromium Molybdenum bars (0.90

1.10 Chrom., 0.25—0.40 Molyb.).....

Chromium Molybdenum bars (0.50

0.70 Chrom., 0.15—0.25 Molyb.).....

Chromium Molybdenum spring steel

(1 — 1.25 Chrom., 0.30 — 0.50

Molyb.).....

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$41.00
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Base Per Lb.

Light (from billets), f.o.b. mill.....	1.65c. to 1.70c.
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Light (from billets), f.o.b. Ch'go mill.....	1.80c. to 1.90c.
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Light (from rail steel), f.o.b. mill.....	1.60c. to 1.65c.
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1827

Track Equipment

(F.o.b. Mill)

more than now is used in closed cars. Prices are given on page 1827.

Tin Plate.—Contracts covering requirements of the larger consumers for the first half have been pretty generally placed and while the leading producer is not entirely so'd up for that period, some of the independent makers are oversold against average production. Business now is merely a matter of specification against contracts.

Cold Finished Steel Bars and Shafting.—Producers in this district are feeling the effect upon shipments of the holidays and inventory period but say that the decline in business is a little less than usual. Shipment suspensions apply only on such tonnages as would reach consumers during the inventory period and it is figured that by Jan. 15 specifications and shipments again will be on a rising scale. Some makers find that the average of prices for this year ranged from \$12 to \$14 a ton lower than in 1924 and there is some talk of an advance that would increase the present differential of \$10 a ton between hot rolled and cold finished steel bars.

Bolts, Nuts and Rivets.—The inventory period this year has not meant as much in the falling away of specifications and shipments as usual and makers in this district are having a reasonably good operation and will start the new year with fair-sized order books. Prices are well maintained. There is some irregularity in prices of large rivets but most makers are adhering to \$2.60, base, per 100 lb. Prices and discounts are given on page 1829.

Old Material.—The final week of the year has seen an increase in interest on the part of several of the local steel companies and, while sales are not materially larger than they have been recently, the idea of early activity is stronger and with it the expectation of firmer prices. An Ohio River steel company recently bought a number of small tonnages of steel work grades, paying \$19 for heavy melting steel, \$18 for compressed sheets and \$17 for bundled sheets. The purchases were chiefly tonnages that had been shipped without orders, it being common practice by dealers to purchase for delivery to a stated point and then negotiate for the sale of the material. Another down-the-river steel company, which has been out of the market and has been offering \$18.50 for heavy melting grade, has lately raised its bid to \$19. Sustaining a quotation of \$19.50 for this grade is a recent sale of about 7000 tons to a user with rather rigid specifications. There is not much activity in the foundry grades.

We quote for delivery to consumer's mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel.....	\$19.00 to \$19.50
No. 1 cast, cupola size.....	17.50 to 18.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.50 to 21.50
Compressed sheet steel.....	18.00
Bundled sheets, sides and ends.....	17.00
Railroad knuckles and couplers.....	21.50 to 22.00
Railroad coil and leaf springs.....	21.50 to 22.00
Low phosphorus blooms and billet ends.....	24.00 to 24.50
Low phosphorus plates and other material.....	23.00 to 23.50
Low phosphorus punchings.....	21.00 to 21.50
Railroad malleable.....	19.50 to 20.00
Steel car axles.....	23.00 to 23.50
Cast iron wheels.....	18.50 to 19.00
Rolled steel wheels.....	22.00 to 22.50
Machine shop turnings.....	14.00 to 14.50
Short shoveling turnings.....	15.00 to 15.50
Sheet bar crops.....	20.50 to 21.50
Heavy steel axle turnings.....	17.00 to 17.50
Short mixed borings and turnings.....	15.00 to 15.50
Heavy breakable cast.....	17.00 to 17.50
Stove plate.....	14.50 to 15.00
Cast iron borings.....	15.00 to 15.50
No. 1 railroad wrought.....	15.00 to 15.50
No. 2 railroad wrought.....	19.00 to 19.50

Coke and Coal.—The furnace coke market on tonnages for prompt shipment is stronger than a week ago. Buyers seeking such supplies lately have not been able to obtain them at less than \$5.50 per net

ton at ovens and as high as \$5.75 has been paid. Although the prospect of a settlement of the anthracite strike is bright, there has been no material let up in the Eastern demand for crushed coke as a substitute for hard coal. It is figured that even if the hard coal miners go back to work immediately two or three weeks must elapse before production can be brought up to the rate just before the suspension. A good deal of the Connellsburg furnace coke production for first quarter shipment has been sold and producers, still having a good outlet for domestic coke, are not accumulating much surplus tonnage. Such spot business as has been done lately in foundry coke has been at unchanged prices. There is plenty of soft coal and even the extra demands of cold weather are not sufficient to give the market strength. Prices are given on page 1829.

Boston

Indian and Continental Irons Lead in Year's Imports—New Warehouse Differentials

BOSTON, Dec. 28.—Pig iron is quiet, with sales for week totaling approximately 1000 tons. Prices are unchanged. Incomplete returns place imports for December at 3665 tons, the smallest for any month in 1925. Indications are that imports for the entire year will total 90,521 tons, distributed as follows: Indian, 52,767 tons; English, 750 tons; Scotch, 950 tons; Continental, 36,054 tons.

We quote delivered prices on the basis of the latest sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25....	\$26.65
East. Penn., sil. 2.25 to 2.75....	27.15
Buffalo, sil. 1.75 to 2.25.....	\$25.91 to 26.91
Buffalo, sil. 2.25 to 2.75.....	26.41 to 27.41
Virginia, sil. 1.75 to 2.25.....	29.92
Virginia, sil. 2.25 to 2.75.....	30.42
Alabama, sil. 1.75 to 2.25.....	31.60 to 32.60
Alabama, sil. 2.25 to 2.75.....	32.10 to 33.10

Warehouse Prices.—Warehouses have made differentials on cold-rolled steel bars and cold-rolled screw stock, less than 100 lb., \$1; 100 to 299 lb., 75c. per 100 lb.; 300 to 499 lb., 50c.

Coke.—Domestic coke is in big demand as a result of colder weather. December importations were 19,384 tons, of which 2995 tons was English and the rest Scotch. Prices are firmer, but not higher. By-product foundry coke is unchanged at \$13, delivered.

Old Material.—The market is quiet, with prices unchanged.

The following prices are for gross ton lots delivered consuming points:

Textile cast.....	\$20.00 to \$20.50
No. 1 machinery cast.....	19.50 to 20.00
No. 2 machinery cast.....	15.50 to 16.50
Stove plate.....	14.50 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$12.00 to \$13.00
No. 1 railroad wrought	13.50 to 13.75
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1 in. in diameter, over 2 ft. long).....	11.50 to 12.00
Machine shop turnings	9.50 to 10.00
Cast iron borings, chemical.....	11.50 to 12.00
Cast iron borings, rolling mill.....	9.50 to 10.00
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap	10.00 to 10.50
Bundled skeleton, long.....	10.00 to 10.50
Forged flashings	10.00 to 10.50
Bundled cotton ties, long	9.00 to 9.50
Bundled cotton ties, short	10.00 to 10.50
Shafting	18.25 to 18.75
Street car axles	18.00 to 18.50
Rails for rerolling	13.50 to 14.00
Scrap rails	12.50 to 13.00

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Semi-Finished Steel F.o.b. Pittsburgh or Youngstown

Billets and Blooms

Per Gross Ton

Rolling, 4-in. and over.....	\$35.00 to \$36.00
Rolling, 2-in. and smaller.....	36.00 to 37.00
Forging, ordinary.....	40.00 to 41.00
Forging, guaranteed.....	45.00 to 46.00

Sheet Bars

Per Gross Ton

Open-hearth or Bessemer.....	\$36.00 to \$37.00
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Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$35.00 to \$36.00
6 in. x 2 in. and smaller.....	36.00 to 37.00

Skelp

Per Lb.

Grooved.....	1.90c.
Sheared.....	1.90c.
Universal.....	1.90c.

Wire Rods

Per Gross Ton

Common soft, base, No. 5 to $\frac{1}{4}$ -in.....	\$45.00
Common soft, coarser than $\frac{1}{4}$ -in.....	\$2.50 over base
Screw stock.....	5c. per ton over base
Carbon 0.20% to 0.40%.....	3.00 per ton over base
Carbon 0.41% to 0.55%.....	5.00 per ton over base
Carbon 0.56% to 0.75%.....	7.50 per ton over base
Carbon over 0.75%.....	10.00 per ton over base
Acid.....	15.00 per ton over base

*Chicago mill base is \$46. Cleveland mill base, \$45.

Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesaba Bessemer, 51.50% iron.....	4.40
Mesaba non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

Per Unit

Iron ore, low phos., copper free, 55 to 58%	
iron in dry Spanish or Algerian, 9.50c. to 10c.	
Iron ore, Swedish, average 66% iron.....	9.50c.
Manganese ore, washed, 51% manganese, from the Caucasus.....	45c.
Manganese ore, Brazilian or Indian, nominal.....	42c.
Tungsten ore, high grade, per unit, in 60% concentrates.....	\$12.00 to \$13.00

Per Ton

Chrome ore, Indian basic, 48% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard.....	\$22.50 to \$24.00
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Per Lb.

Molybdenum ore, 85% concentrates of MoS ₂ , New York.....	66c. to 70c.
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Coke

Per Net Ton

Furnace, f.o.b. Connellsville prompt.....	\$5.50 to \$5.75
Foundry, f.o.b. Connellsville prompt.....	5.50 to 6.00
Foundry, by-product, Ch'go ovens.....	10.50
Foundry, by-product, New England, del'd.....	13.00
Foundry, by-product, Newark or Jersey City, del'd.....	11.52
Foundry, Birmingham.....	6.75
Foundry, by-product, St. Louis or Granite City.....	10.00

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines.....	\$1.50 to \$2.10
Mine run coking coal, f.o.b. W. Pa. mines.....	2.00 to 2.25
Mine run gas coal, f.o.b. W. Pa. mines.....	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines.....	1.40 to 1.50
Gas slack, f.o.b. W. Pa. mines.....	1.50 to 1.60

Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$35.00 to \$36.00
6 in. x 2 in. and smaller.....	36.00 to 37.00

Skelp

Per Lb.

Grooved.....	1.90c.
Sheared.....	1.90c.
Universal.....	1.90c.

Wire Rods

Per Gross Ton

Common soft, base, No. 5 to $\frac{1}{4}$ -in.....	\$45.00
Common soft, coarser than $\frac{1}{4}$ -in.....	\$2.50 over base
Screw stock.....	5c. per ton over base
Carbon 0.20% to 0.40%.....	3.00 per ton over base
Carbon 0.41% to 0.55%.....	5.00 per ton over base
Carbon 0.56% to 0.75%.....	7.50 per ton over base
Carbon over 0.75%.....	10.00 per ton over base
Acid.....	15.00 per ton over base

*Chicago mill base is \$46. Cleveland mill base, \$45.

Raw Materials

Ferromanganese

Per Gross Ton

Domestic, 80%, furnace or seab'd.....	\$115.00
Foreign, 80%, Atlantic or Gulf port, duty paid.....	115.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....	\$32.00 to \$34.00
Domestic, 16 to 19%.....	\$1.00 to 3.00

Electric Ferrosilicon

Per Gross Ton Delivered

50%.....	\$85.00
75%.....	145.00

Bessemer Ferrosilicon

Per Gross Ton Furnace

10%.....	\$42.00
11%.....	42.00

Silvery Iron

Per Gross Ton Furnace

Per Gross Ton	Per Gross Ton
6%	\$27.50
7%	28.50
8%	29.50
9%	31.00

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd.....

Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered.....

Ferrovanadium, per lb. contained vanadium, f.o.b. furnace.....

Ferrocobaltitium, 18 to 18%, per net ton, f.o.b. furnace, in carloads.....

Ferrophosphorus, electrolytic, or blast furnace material, in carloads, 18%. Rockdale, Tenn., base, per net ton.....

Ferrophosphorus, electrolytic, 24%, f.o.b. Anniston, Ala., per net ton.....

Standard size.....

Per Net Ton

Pennsylvania

Maryland

Ohio

Kentucky

Illinois

Missouri

Ground fire clay, per ton.....

Silien Brick

Per 1000 f.o.b. Works

Pennsylvania

Chicago

Birmingham

Silica clay, per ton.....

Magnesite Brick

Per Net Ton

Standard size, f.o.b. Baltimore and Chester, Pa.

Grain magnesite, f.o.b. Baltimore and Chester, Pa.

40.00

Chrome Brick

Per Net Ton

Standard size

\$48.00

Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

Per Cent Off List

Semi-finished hexagon nuts:

$\frac{1}{4}$ in. and smaller, U. S. S.....

$\frac{1}{4}$ in. and larger, U. S. S.....

Small sizes, S. A. E.

$\frac{1}{4}$ in. and larger, S. A. E.

Stove bolts in packages.....

$\frac{1}{4}$ in. and larger, S. A. E.

Tire bolts

Large Rivets

Large Rivets

Base Per 100 Lb.

F.o.b. Pittsburgh

F.o.b. Cleveland

F.o.b. Chicago

2.70

2.75

Small Rivets

Per Cent Off List

F.o.b. Pittsburgh

F.o.b. Cleveland

F.o.b. Chicago

70 and 10

70 and 10

70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

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Chicago

Structural Specifications Unusually Heavy —Reinforcing Awards of 6000 Tons

CHICAGO, Dec. 28.—With the closing of 1925 operations stand at 88 per cent of ingot capacity for the leading interest and near the 85 per cent mark for the foremost independent. Ten out of 12 stacks are active at Gary, six out of the 11 furnaces at South Chicago, and only one of four at Joliet. The Inland Steel Co. has its three stacks in at Indiana Harbor, and is pushing forward with all possible speed the construction of a fourth unit. The Wisconsin Steel Co. has all three of its stacks in blast, and both blast furnaces of the Youngstown Sheet & Tube Co. at Indiana Harbor are active. Steel mills were closed Christmas day, resuming operations again the day following, and they expect to continue the present rate of operations through the remainder of the holiday season.

New business is well maintained in shapes, plates and bars. Structural specifications are unusually heavy, having been exceeded only once since last January. The volume of business in these commodities is being influenced materially by the requirements of car builders. Fully half of the tonnage passed on to mills last week was for railroad car manufacturers. All told about 65,000 freight cars have been placed this year. Of that number 25,300 were contracted for prior to Aug. 1, and 39,300 in the last five months of the year. A number of the smaller railroads have contracted for standard rails during the week, one maker having booked miscellaneous orders totaling 8000 tons. Track fastenings have also moved in good volume, one mill having taken orders for 37,000 kegs of spikes and bolts. Billets and sheet bars are in good demand.

Mills report that orders and specifications by automobile makers have fallen off within the past few weeks. On the other hand, farm implement manufacturers and tractor builders are very liberal in placing their requirements.

Shipments of merchant pig iron have declined slightly, although makers report that requests for deferred shipment are unusually few in number for this season of the year. Furnaces will enter the new year with operations unchanged. Distress tonnage and lack of interest upon the part of users are still outstanding influences in a weak scrap market.

Pig Iron.—Makers report that December shipments will be slightly less than during November. At the same time users are specifying freely against contracts and orders to defer shipments are small in number. Foundry grades are steady at \$23, Chicago furnace. Two users in Michigan have inquired for 500 tons each of Northern foundry. Spot buying of charcoal iron has revived slightly, with prices unchanged. First quarter contracting for silvery is practically completed at a dollar advance over the present quotations. Reports to the trade indicate that several divisions of the General Motors Corporation will place contracts for silvery shortly after the first of the year. A few sales of silvery are being made for delivery before the first of the year.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	\$23.00
Northern No. 1 foundry, sil. 2.25 to 2.75	23.50
Malleable, not over 2.25 sil.	23.00
High phosphorus	23.00
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	29.04
Southern No. 2 (all rail)	27.01
Southern No. 2 (barge and rail)	26.18
Low phos., sil. 1 to 2 per cent, copper free	\$31.20 to 31.60
Silvery, sil. 8 per cent	34.29
Ferrosilicon, 14 to 16 per cent	45.25 to 45.75

Ferroalloys.—The market is quiet and prices are unchanged at \$122.56, delivered, for 80 per cent ferro-

manganese; \$85, delivered, for 50 per cent ferrosilicon, and \$41.76, delivered, for 18 to 22 per cent spiegeleisen.

We quote 80 per cent ferromanganese, \$122.56, delivered; 50 per cent ferrosilicon, \$85, delivered; spiegeleisen, 18 to 22 per cent, \$41.76, delivered.

Plates.—Nearly 40,000 freight cars have been purchased during the last five months of the year. This number, added to the 25,000 previously placed, makes the total for the year 65,000. The Chicago & North Western is contemplating repairing a number of cars in its own shops and has asked for prices on 450 underframes. Demand for plates for oil storage tanks is in small volume. At the same time, a substantial volume of business is in sight for water tanks. The demand for plates is not equal to that of other finished products, and makers are able to make delivery in from two to four weeks. The Chicago mill price is firm at 2.10c.

The mill quotation is 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Bars.—Sales and specifications for soft steel bars are still heavy. Jobbers report that December bar business is well in excess of that of a year ago at this time. Makers of bar iron find specifications more liberal and order books heavier than for some time past. Mill operations are well maintained and prices are steady at 2c., Chicago. Fourth quarter contracts, which were placed at 1.90c., Chicago, have been completely specified, as users were anxious to take full advantage of the lower figure. Rail steel bar mills will not shut down over the New Year holiday period, but will continue operations at an unchanged rate. Specifications are liberal and new bookings were increased by a sudden rush last week to close up pending reinforcing bar projects. Rail steel bars are unchanged at 2c. to 2.10c., Chicago.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 2c., Chicago; rail steel bars, 2c. to 2.10c., Chicago.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.60c. for rounds and hexagons and 4.10c. for flats and squares; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Rails and Track Supplies.—Several small Western railroads placed their rail requirements during the week. One mill booked a total of 8000 tons of standard rails in miscellaneous lots. Rail fastenings and supplies have moved in good volume and a substantial tonnage is still in sight. A local mill took 1200 tons of angle bars, 37,000 kegs of spikes and bolts and 3000 tons of tie plates in miscellaneous orders.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled from billets, 1.80c. to 1.90c., f.o.b. maker's mill.

Standard railroad spikes, 2.90c. to 3c. mill; track bolts with square nuts, 2.90c. to 4c. mill; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.55c., base, and track bolts, 4.55c., base.

Wire Products.—Specifications are said to have held up well during the last two weeks of December. It is noticeable, however, that automobile manufacturers are not so busy, although farm implement manufacturers remain very active. Jobbers are said to be anticipating the requirements of the spring trade and are now placing substantial orders for delivery during the latter part of January and February. Mill operations are unchanged, as a whole, and average about 70 per cent. Prices, which are unchanged, are shown on Page 1827.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, \$3.30 per 100 lb.; common wire nails, \$3.05 per keg; cement-coated nails, \$2.05 to \$2.20 per count keg.

Structural Material.—Specifications for plain material for the week have been exceeded but once since last January. The tonnage was not wholly for building construction, as the mills have received liberal specifications for structural shapes from car builders. Contracts signed by fabricators and fresh projects were light during the week. Shops are fairly well booked,

although some complaint is heard from the larger fabricators that the bulk of the tonnage now passing through the shops is heavy in character and that more satisfactory plant schedules could be arranged if both large and small work were more evenly proportioned. Competition has remained keen throughout the fall and winter, and although prices have advanced somewhat, still the margin of profit is not what fabricators would like to have it.

The mill quotation on plain material is 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Sheets.—Chicago mills continue to operate at practically 100 per cent of capacity. Specifications against first quarter contracts are said to be liberal. Chicago delivered prices are steady at 3.50c. for black, 2.65c. for blue annealed, and 4.75c. for galvanized sheets.

Chicago delivered prices from mill, 3.50c. for No. 28 black, 2.65c. for No. 10 blue annealed and 4.75c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.50c. base for blue annealed, 4.10c. base for black, and 5.25c. base for galvanized.

Cold-Rolled Strips.—This commodity is still in good demand and mills are operating practically at 100 per cent capacity. Prices are steady at 3.90c., Cleveland, or 4.30c., delivered Chicago.

Cast Iron Pipe.—The Chicago market is quiet and the ruling price remains at \$42, base Birmingham, for 6-in. and larger diameters. South Bend, Ind., has placed 1500 tons of 6 and 8-in. Class B pipe with the Lynchburg Foundry Co. Thomas Iglehart, Chicago, is low bidder on the general contract for 1600 tons of 6, 8, 10 and 12-in. Class B pipe for Downers Grove, Ill. Makers report the placement of a few contracts calling for small tonnages. Order books are said to obligate pipe shops for 30 to 40 days.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$54.20; 6-in. and over, \$50.20; Class A and gas pipe, \$4 extra.

Billets and Sheet Bars.—One maker has booked 5000 tons of small billets and sheet bars during the week. Billets are generally quoted at \$35, Chicago, although one maker insists that he has nothing to offer at less than \$37, and that he is taking business at that figure. Sheet bars are firm at \$36 per gross ton.

Cold-Finished Steel Bars.—This commodity is in good demand, with prices steady at 2.50c. per lb., Chicago. Makers have recently placed orders for 17,000 tons of hot-rolled bars with a Chicago mill.

Bolts, Nuts and Rivets.—This market is quiet, except for the closing up of first quarter contracts. Small rivets are in fair demand and are quoted at 70, 10 and 5 per cent off list in bulk and 70 and 10 off list in packages.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to $\frac{1}{2}$ x 4 in., 50 and 5 per cent off; larger sizes, 50 and 5 off; carriage bolts up to $\frac{1}{2}$ x 4 in., 47 $\frac{1}{2}$ off; larger sizes, 47 $\frac{1}{2}$ off; hot-pressed nuts, square, tapped or blank, \$3.25 off; hot-pressed nuts, hexagon, tapped or blank, \$3.75 off; coach or lag screws, 55 and 5 per cent off.

Reinforcing Bars.—Contractors have made this a busy week for the reinforcing bar trade by closing on a large number of pending projects. The aggregate business placed was in the neighborhood of 6000 tons, counting numerous small jobs. Reports to the trade are to the effect that bond houses are well prepared to finance building construction for the coming year. The warehouse price of billet steel reinforcing bars is steady at 2.60c., Chicago. Recent contracts and fresh pending work are shown on page 1833.

Coke.—Shipments of by-product foundry coke are unusually heavy and makers, with all ovens lighted, are finding production is just about equal to specifications.

Old Material.—The holiday and inventory seasons, combined with distress tonnage appearing on track and a disinterested attitude upon the part of buyers, have contributed to a further weakening of the scrap mar-

ket. Buying is at a low point; with the exception of a fair tonnage of heavy melting steel taken at \$15.50 by a large user, sales are confined to scattered carlots. It is the consensus of opinion in the trade that dealers' yards are stocked with about the same amount of scrap as at this time last year. Railroad offerings include 6000 tons advertised by the Chicago, Burlington & Quincy, and a blank list from the Michigan Central.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

	Per Gross Ton
Iron rails	\$18.00 to \$18.50
Cast iron car wheels	18.00 to 18.50
Relaying rails, 56 lb. to 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	18.50 to 19.00
Railroad tires, charging box size	19.00 to 19.50
Railroad leaf springs, cut apart	19.00 to 19.50
Rails for rolling	18.00 to 18.50
Steel rails, less than 3 ft.	18.50 to 19.00
Heavy melting steel	15.25 to 15.50
Frogs, switches and guards, cut apart	17.25 to 17.75
Shoveling steel	15.25 to 15.50
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheets	13.50 to 14.00
Axle turnings	15.00 to 15.50
Steel angle bars	18.00 to 18.50
Steel knuckles and couplers	18.00 to 18.50
Coil springs	19.00 to 19.50
Low phos. punchings	17.25 to 17.75
Machine shop turnings	9.25 to 9.75
Cast borings	13.50 to 13.75
Short shoveling turnings	13.25 to 13.75
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.50 to 17.00

	Per Net Ton
Iron angle and splice bars	16.50 to 17.00
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.00 to 26.50
Steel car axles	18.00 to 18.50
No. 1 busheling	12.00 to 12.50
No. 2 busheling	9.25 to 9.75
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	16.25 to 16.75
No. 1 agricultural cast	16.25 to 16.75
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.75 to 15.25
Grate bars	14.00 to 14.50
Brake shoes	18.00 to 18.50

RAILROAD EQUIPMENT

Baltimore & Ohio in the Market for 1000 Steel Hopper Cars But May Buy 2000

Aside from an inquiry from the Baltimore & Ohio for 1000 steel hopper cars, the railroad equipment market is devoid of new business. The B. & O. may buy 2000 hopper cars. It recently ordered 2000 box cars. The principal items of the week follow:

The Chicago & North Western is in the market for 453 underframes.

The Buck Mountain Coal Mining Co. has ordered 100 mine cars from the American Car & Foundry Co.

The Mobile & Ohio has placed four coaches and six baggage and express cars with the American Car & Foundry Co.

The Reading Co. has ordered 15 baggage cars from the American Car & Foundry Co.

The Atlantic Coast Line has placed 72 passenger service cars with the Pullman Car & Mfg. Corporation.

The Delaware, Lackawanna & Western has ordered 35 express cars from the American Car & Foundry Co.

The Baltimore & Ohio is inquiring for 1000 70-ton hopper cars, but has authority to buy twice that number. These cars will be in addition to the 2000 box cars bought by that road a week ago.

The New York, Chicago & St. Louis is inquiring for 400 underframes.

The Missouri Pacific has ordered 15 8-wheel switching locomotives from the Lima Locomotive Works, in addition to 15 locomotives of other types placed with the American Locomotive Co. a week ago.

New York

Port Henry Stack Goes in—Nails Show Some Weakness

NEW YORK, Dec. 28.—In the face of the diverting influence of the holiday season, pig iron business placed during the week totaled close to 4000 tons. Most current orders consist of small lots for spot delivery, indicating that melters are not well fortified with reserve stocks. There is likewise rather general insistence on particular analyses, which also emphasizes the fact that buying is against actual early needs. The Moore Brothers Co., Elizabeth, N. J., which was in the market for 500 to 1000 tons of foundry for first quarter, has closed against the inquiry. Business still pending does not total more than 2000 tons. The melt in this section is well maintained and considerable additional buying for first quarter is looked for after the completion of inventory taking. Meanwhile the coke market is being watched for its possible effect on pig iron. It is the consensus of opinion that the anthracite strike will be settled within the next fortnight. Extremely low temperatures, however, have materially increased the consumption of fuel for heating, sustaining coke prices for the time being at least. Prices of both domestic and foreign irons remain substantially unchanged. The No. 2 furnace at Port Henry, N. Y., was blown in Dec. 25.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.54 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25..	\$25.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	\$25.52 to 26.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	26.02 to 26.52
Buffalo, sil. 1.75 to 2.25.....	25.91 to 26.91
No. 2 Virginia, sil. 1.75 to 2.25..	29.54

Ferroalloys.—The absence of inquiry for ferromanganese of any proportions continues as the year closes. Only one company is inquiring for a fairly large amount. It is 600 tons for a Western consumer. It is reported that a large Canadian company is in the market for 1000 to 1500 tons, but this will probably be bought through Canadian sellers. There have been sales of a few small and carload lots at regular prices. In spiegeleisen very little new business has appeared, large consumers being well covered for next year. Prices of this alloy are also unchanged.

Warehouse Business.—The holidays have brought business almost to a standstill and quotations are unchanged on practically all products. The undertone of the market is strong, however, and advances in price, particularly in the case of black and galvanized sheets, are expected as soon as the seasonal dullness is over. At the present minimum quotations of 4.35c. and 5.35c. per lb. base, respectively, it is claimed that black and galvanized sheets could not be replaced in jobbers' stocks except at a loss. Demand for structural material out of stock is at a low level, but a resumption of small lot buying is expected early in January. Prices on page 1854. We quote boiler tubes per 100 ft. as follows:

Lap welded steel tubes, 2-in., \$17.33; seamless steel, 2-in., \$20.24; charcoal iron, 2-in., \$25; 4-in., \$67.

Cast Iron Pipe.—Bell and spigot water pipe inquiry has disappeared in this district and makers are awaiting the first of the municipal calls for bids which usually appear early in the new year. Private buying of gas pipe, however, is practically as heavy as at any time during recent months. The Brooklyn Union Gas Co., Brooklyn, N. Y., has awarded between 8000 and 10,000 tons of gas pipe, distributed among the United States Cast Iron Pipe & Foundry Co., Warren Foundry & Pipe Co. and the Donaldson Iron Works. The Consolidated Gas Co. of Boston has purchased about 4000 tons of gas pipe from the Warren Foundry & Pipe Co. and the Consolidated Gas Co. of New York, is reported to have

closed a large part of its requirements of 6000 to 7000 tons with the United States Cast Iron Pipe & Foundry Co. Soil pipe continues unchanged and quiet.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$50.60 to \$52.60; 4-in. and 5-in., \$55.60 and \$57.60; 3-in., \$65.60 to \$67.60, with \$5 additional for Class A and gas pipe. Discounts both of Northern and of Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 42½ to 43¼ per cent off list; heavy, 52½ to 53¾ per cent off list.

Finished Iron and Steel.—The last week of the year was devoted largely to releases of specifications against contracts to protect against cancellation or to provide for supplies after the inventory season. Sellers reported a good December and well filled order books, in many cases showing a greater tonnage than was so a year ago. It is not so clear that plates can be obtained as readily as recently for immediate delivery and signs point to a further stiffening at a minimum of 1.80c., Pittsburgh. Claims of price weakness have this week switched to wire nails, which appear to have been obtained at \$2.60 base against the prevailing quotation of \$2.65 per keg.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. to 2.44c.; plates, 2.09c. to 2.14c.; structural shapes, 2.24c. to 2.34c.; bar iron, 2.24c.

Coke.—Strengthening of the coke market, which would probably have occurred as a result of the sudden cold weather, has apparently been considerably modified by the fact that both buyers and sellers of coke are inclined to await the outcome of the operators and miners' conference tomorrow. In the meantime, foundry coke continues firm at \$5.50 to \$6.50 per ton, and domestic sizes slightly stronger at \$7.50 up to \$8.50 per ton. By-product is still quoted at \$11.52 per ton, delivered Newark and Jersey City, N. J.

Old Material.—The holidays and the sudden cold weather have contributed to slowing down activity in buying and selling of scrap. Although all grades are quiet and in several cases brokers are offering lower prices than a week or two ago, there is no particular evidence of weakness and a resumption of activity is rather generally expected after the turn of the year. No. 1 heavy melting steel is unchanged at \$16.75 to \$17 per ton, delivered eastern Pennsylvania consumers. Specification pipe is being purchased at \$16.50 per ton, delivered on a freight rate of \$3.78 per ton. Machine shop turnings are quoted at \$14 to \$14.50 per ton delivered, the price depending upon the freight rate to consumer's plant. Stove plate for foundry use is inactive, the usual local consumers taking low freight rates, not having purchased lately.

Buying prices per gross ton New York, follow:
Heavy melting steel (yard)....\$11.75 to \$12.25

Heavy melting steel (railroad or equivalent)	13.50 to 14.00
Rails for rolling	14.50 to 15.00
Relaying rails, nominal.....	23.00 to 24.00
Steel car axles	20.50 to 21.50
Iron car axles	24.50 to 25.00
No. 1 railroad wrought	14.50 to 15.00
Forge fire	10.50 to 11.50
No. 1 yard wrought, long.....	14.00 to 14.50
Cast borings (steel mill)	10.25 to 11.25
Cast borings (chemical).....	14.00 to 14.50
Machine shop turnings.....	10.75 to 11.25
Mixed borings and turnings	10.75 to 11.25
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	12.25 to 12.75
Stove plate (steel mill).....	10.25 to 10.75
Stove plate (foundry).....	12.00 to 12.25
Locomotive grate bars.....	11.50 to 12.00
Malleable cast (railroad).....	16.50 to 17.50
Cast iron car wheels	14.00 to 14.50
No. 1 heavy breakable cast	14.00 to 15.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	\$18.50 to \$19.00
No. 1 heavy cast (columns, building material, etc), cupola size 17.00 to 17.50	
No. 2 cast (radiators, cast bollars, etc)	16.00 to 16.50

San Francisco

Southern Pacific Inquiries for Rails—Shapes Active—Prices Firm

SAN FRANCISCO, Dec. 24 (By Air Mail).—An inquiry for about 25,000 tons of rails has been put out by the Southern Pacific Co., with the understanding that it will be in the market again in the near future for 75,000 tons additional. Structural material continues fairly active, but even in this department of the market there has been an easing off during the past week because of the Christmas holidays and the approach of inventory. Prices generally are firm, particularly in the heavier products. There has been no conspicuous evidence of price concessions during the week, and it is now generally believed that Eastern mills will endeavor to hold quotations at the present level during the first quarter.

Pig Iron.—There is no business of importance being transacted, and no inquiries of moment are expected to come out for some time, as practically all of the larger buyers are understood to have contracted for their first quarter requirements. Prices are unchanged.

*Utah basic	\$27.00 to \$28.00
*Utah foundry, sl. 1.75 to 2.25	27.00 to 28.00
**English foundry	26.00
**Belgian foundry	24.50 to 25.00
**Dutch foundry	24.00
**Indian foundry	24.00 to 25.00
**German foundry	25.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Shapes.—Lettings for the week total 2205 tons, and fresh inquiries call for about 700 tons. The largest award, 1500 tons, for the Cascade Locks Bridge over the Columbia River, Wash., was taken by the Wallace Equipment Co., Seattle. Eastern mill quotations are holding firmly at 2.35c. to 2.40c., c.i.f. Coast ports.

Plates.—A German bid on welded pipe is understood to be low on a penstock job for the San Joaquin Light & Power Co., Fresno, Cal., which calls for about 1100 tons of welded and about 400 tons of riveted material. No official award has yet been made, and neither confirmation nor denial of this report could be obtained at the office of the power company. No letting is expected to be made by the city of Bend, Ore., on its pipe line project, calling for 850 tons, until after Jan. 1. No fresh inquiries of importance have come up for figures. While price protection on pending projects is still being given to fabricators by most of the Eastern mills, nothing below 2.30c., c.i.f. Coast ports, is known to have been quoted during the week on new business. On small tonnages most of the mills are asking 2.35c.

Bars.—No large tonnages are known to have been placed during the week with local reinforcing bar jobbers. Price shading continues and current quotations are nominal at 2.75c. to 2.85c., base, per lb., on less-than-carload lots. On larger lots 2.50c., or equivalent, is understood to be possible.

Warehouse Business.—Buying has eased off appreciably, primarily because of the holidays and the approach of inventory. Prices are unchanged.

Merchant bars, \$3.30 base, per 100 lb.; merchant bars, $\frac{3}{8}$ in. and under, rounds, squares and flats, \$3.80 base, per 100 lb.; soft steel bands, \$4.15 base, per 100 lb.; angles, $\frac{1}{4}$ in. and larger $\times \frac{1}{2}$ in. to $2\frac{1}{2}$ in., inc., \$3.30 base, per 100 lb.; channels and tees, $\frac{3}{8}$ in. to $2\frac{1}{2}$ in., inc., \$3.90 base, per 100 lb.; angles, beams and channels, 3 in. and larger, \$3.30 base, per 100 lb.; tees, 3 in. and larger, \$3.30 base, per 100 lb.; universal mill plates, $\frac{1}{4}$ in. and heavier, stock lengths, \$3.30 base, per 100 lb.; spring steel, $\frac{1}{4}$ in. and thicker, \$6.50 base, per 100 lb.; wire nails, \$3.50 base, per 100 lb.; cement coated nails, \$3 base, per 100 lb.; No. 10 blue annealed sheets, \$3.75 per 100 lb.; No. 28 galvanized sheets, \$6 per 100 lb.; No. 28 black sheets, \$4.75 per 100 lb.

Cast Iron Pipe.—Plans and specifications are being prepared by F. A. Rhodes, city manager, City Hall, San Diego, Cal., and T. A. Mills, assistant engineer, Engineering Department, Water Development, 441 McNeese Building, San Diego, for the construction of about 25 miles of steel, or cast iron, conduit from the proposed El Capitan dam site to the city of San Diego.

If fabricated steel pipe is selected, the minimum quantity of plates required will be about 10,000 tons, as previously reported. If cast iron pipe is used it is estimated that at least 20,000 tons of 30-in. pipe will be needed. The city of Alhambra, Cal., has placed 268 tons of 6 to 16-in. Class B with B. Nicoll & Co., Inc., San Francisco. The city of Sunnyvale, Cal., has awarded 221 tons of 4 and 6-in. Class B to Grinnell Co. of the Pacific, San Francisco, which, it is understood, will furnish Belgian pipe. The city of Vallejo, Cal., has divided about 100 tons of 4, 6 and 8-in. Class B between the United States Cast Iron Pipe & Foundry Co. and the American Cast Iron Pipe Co.

Steel Pipe.—The Shell Oil Co., San Francisco, has placed 125 tons of 2, 3, 4, 6 and 8-in. line pipe with the Grinnell Co. of the Pacific. The San Joaquin Light & Power Co., Fresno, Cal., is inquiring for about 200 tons of standard pipe.

Sheets.—Somewhat more active interest is expected shortly after the first of the year, although a number of the larger buyers have specified their requirements for the first quarter. Eastern mills are quoting as follows: Blue annealed sheets, 2.50c., base Pittsburgh; black sheets, 3.35c., and galvanized sheets, 4.60c.

Coke.—Practically no business of importance is up for figures. Buyers are fairly well covered on their first quarter requirements. Importers quote as follows:

English beehive, \$15 to \$16 at incoming dock, and English by-product, \$12 to \$14; German by-product, \$11.50 to \$12.

Old Material.—Buyers are still specifying for the first quarter, although the bulk of this business is believed to have been closed.

Prices for scrap delivered to consumers' yards are as follows:

Per Gross Ton
No. 1 heavy melting steel.....\$11.50 to \$12.00
Scrap rails, miscellaneous.....11.50 to 12.00
Rolled steel wheels.....11.50 to 12.00
Couplers and knuckles.....11.50 to 12.00
Country mixed scrap.....8.00 to 8.50
Mixed borings and turnings.....6.00 to 6.50
No. 1 cast scrap.....19.50 to 20.00

REINFORCING STEEL

Awards in the Week Total More Than 4000 Tons in Small Jobs

The total of concrete reinforcing bar contracts reported during the week was 4080 tons. This was made up entirely of jobs ranging from about 100 to 300 tons each. The awards follow:

Waterway Paper Products Co., Chicago, factory, 200 tons, to Olney J. Dean & Co.

Marquette Hotel, Peoria, Ill., 140 tons, to Olney J. Dean & Co.

Hotel, 900 North Michigan Avenue, Chicago, 335 tons, to Concrete Steel Co.

Bridge for the city of Rockford, Ill., 300 tons, to Olney J. Dean & Co.

Jackson Building, Chicago, 300 tons, to Concrete Steel Co.

Belmont Harbor Hotel, 436 Belmont Avenue, Chicago, 200 tons, to Concrete Steel Co.

Angelus Apartments, 622 Gary Place, Chicago, 100 tons, to Concrete Steel Co.

Apartment building, Evanston, Ill., 300 tons, to American System of Reinforcing.

Atwater Bridge, Milwaukee, 330 tons to Kalman Steel Co.

Paris Garter Co., building, 1140 West Congress Street, Chicago, 300 tons, to Olney J. Dean & Co.

Bridge at Cherry Valley, Ill., 100 tons, to Olney J. Dean & Co.

Apartment hotel, 432 Belmont Avenue, Chicago, 100 tons, to Concrete Steel Co.

Loft Building, Monroe Street and Wabash Avenue, Chicago, 200 tons, to Concrete Steel Co.

Henry Building, 201 East Delaware Street, Chicago, 475 tons rail steel, to Calumet Steel Co.

Webster Arms Hotel, Sedgwick and Webster Streets, Chicago, 400 tons rail steel to the Calumet Steel Co.

Gratiot Street sewer, St. Louis, 200 tons, to Laclede Steel Co.

Union Electric Light & Power Co. Building, St. Louis, alterations, 100 tons, to Laclede Steel Co.

Birmingham

Demand and Plant Operations Suffer Only Brief Holiday Interruption

BIRMINGHAM, Dec. 28.—Demand for pig iron suffered only a brief interruption on account of holiday season, although inquiries and orders have been confined principally to small lots. The larger consumers look for a continuation of good business and expect to close for additional forward requirements in iron shortly. Cautious selling, however, is the policy of furnaces in view of the large tonnage already disposed of for first quarter delivery. Very little iron has been sold as yet for second quarter. Prices range from \$22 to \$23, base Birmingham, per ton, for foundry iron, with two independent companies holding firmly to \$23. Spot iron during the past month has brought \$23 rather consistently, and reports of even higher prices are current. Operations have been resumed at practically all of the foundries in this territory. A minimum of time was taken for holiday observance this year. There is no apprehension here that blast furnaces will over-produce. On the contrary, the first quarter of the coming year promises to be very active in make and delivery. Moreover, prospects are bright that when books are opened, there will be heavy selling for second quarter.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2, foundry, 1.75 to 2.25 sil...	\$22.00 to \$23.00
No. 1 foundry, 2.25 to 2.75 sil...	22.50 to 23.50
Basic	22.00
Charcoal, warm blast	30.00 to 32.00

Rolled Steel.—Both production and fabrication of steel are on a large scale. At the Ensley mill a minimum of time was set aside for the holiday—36 hours. At many of the fabricating plants operations were suspended for 48 hr. and three days was the extreme. Fabricators of steel are again disturbed because of uncertain transportation service into Florida, where much building is under way and in prospect and large quantities of steel are being used. The railroads have simply been swamped with traffic bound for that State and no preference has been shown in handling shipments of building material. Several important mills here have bookings warranting several months of steady operation. The Ensley rail mill, shops producing railroad accessories, and wire and nail producers are working against forward obligations. The Fairfield sheet mill, which began operations in November, is well booked. Plates and shapes are quoted at from 2.05c. to 2.15c., base Birmingham, with soft steel bars ranging from 2.15c. to 2.25c.

Cast Iron Pipe.—Cast iron pressure pipe shops have gotten back to work, after a suspension of three days over the holiday. Order books show considerable unfilled tonnage for early spring. In view of a splendid beginning, the coming year is expected to be a banner year in cast iron pipe. Production promises to expand in the next 90 days.

Coke.—Every ton of coke being made is finding a ready demand. Production is close to the maximum, the demand for coal considered. Coal output is heavy with prospects for even larger production. Foundry coke continues to range from \$5.75 to \$6 per net ton, Birmingham.

Old Material.—The old material market is unchanged, with very little buying under way. Deliveries, however, are in good volume and quotations are steady. Consumption promises to remain large.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical....	\$15.00 to \$16.00
Heavy melting steel	14.00 to 14.50
Railroad wrought	13.00 to 13.50
Steel axles	19.00 to 20.00
Iron axles	18.00 to 19.00
Steel rails	14.00 to 14.50
No. 1 cast	17.00 to 17.50
Tramcar wheels	17.00 to 17.50
Car wheels	16.00 to 16.50
Stove plate	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Rails for rolling	17.50 to 18.00

St. Louis

Cold Weather Stimulates Coke Demand —Other Products Suffer Holiday Lull

ST. LOUIS, Dec. 28.—Because of the holidays the pig iron market is quiet. The situation is strong, however. Melters in the district are still pressing furnaces for shipments against contracts. Most users are now well covered on their full first quarter requirements. Makers have not opened their books for second quarter.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25..	\$25.66
Northern malleable, sil. 1.75 to 2.25 ..	25.66
Basic	25.66
Southern fd., sil. 1.75 to 2.25 ..	\$26.42 to 27.92
Granite City iron, sil. 1.75 to 2.25 ..	24.31 to 24.81

Finished Iron and Steel.—The market for finished iron and steel is extremely quiet. A few specifications against contracts are being received, but no new business is being placed, since jobbers and consumers are delaying further buying until after the first of the year. No new structural steel jobs have been let in several weeks, and none of any size is pending. The Laclede Steel Co. got orders for 200 tons of reinforcing bars for the Gratiot Street sewer, St. Louis, and 100 tons for alterations to the Union Electric Light & Power Co. Building, St. Louis.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.25c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, cold rolled, one pass, 4.60c.; galvanized sheets, No. 28, 5.70c.; black corrugated sheets, 4.65c.; galvanized, 5.75c.; cold rolled rounds, shafting and screw stock, 3.75c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, $\frac{1}{8}$ in. diameter and smaller, 70 per cent of list; machine bolts, 55 per cent; carriage bolts, 50 and 5 per cent; lag screws, 55 $\frac{1}{4}$ per cent; hot-pressed nuts, square, \$3.25; hexagon, blank or tapped, \$3.75 off list.

Coke.—Specifications for domestic coke against contracts have increased as a result of the cold weather, especially in the North, where the anthracite situation has caused a great demand for coke. Shipments are holding up well, although they are not quite so heavy as in November, which was a record month.

Old Material.—The market for old material is unchanged. On account of the holiday season consumers are out of the market, but, with the turn of the year, it is expected that several large orders will be placed by mills in the district. In anticipation of this dealers are expected to pay higher prices. A few railroad lists were issued by wire, so eager are railroads to clean up their stocks before inventory. Most lines have succeeded, and offerings will be light after Jan. 1. New lists include: Pennsylvania, 900 tons of melting rails; Missouri-Kansas-Texas, 500 tons; Union Pacific, 2900 tons; Big Four, 2500 tons; Dodge Brothers, 4800 tons, and Canadian National, 1700 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron rails	\$14.50 to \$15.00	
Rails for rolling	18.25 to 18.75	
Steel rails less than 3 ft.....	19.25 to 19.75	
Relaying rails, 60 lb. and under ..	24.00 to 25.00	
Relaying rails, 70 lb. and over ..	30.00 to 31.00	
Cast iron car wheels	18.00 to 18.50	
Heavy melting steel	15.00 to 15.50	
Heavy shoveling steel	15.00 to 15.50	
Frogs, switches and guards cut apart	17.50 to 18.00	
Railroad springs	19.00 to 19.50	
Heavy axles and tire turnings	13.00 to 13.50	
No. 1 locomotive tires	16.50 to 17.00	
Per Net Ton		
Steel angle bars	15.00 to 15.50	
Steel car axles	17.50 to 18.00	
Iron car axles	24.00 to 24.50	
Wrought iron bars and transoms	19.50 to 20.00	
No. 1 railroad wrought	12.50 to 13.00	
No. 2 railroad wrought	13.25 to 13.75	
Cast iron borings	11.00 to 11.50	
No. 1 busheling	11.50 to 12.00	
No. 1 railroad cast	15.00 to 15.50	
No. 1 machinery cast	17.00 to 17.50	
Railroad malleable	14.50 to 15.00	
Machine shop turnings	8.50 to 9.00	
Bundled sheets	8.75 to 9.25	

Cleveland

Steel Demand Good for Holiday Season— Coke Strong

CLEVELAND, Dec. 28.—The volume of steel business the past week has been unusually good for the holiday season. Mills booked considerable tonnage against first quarter contracts, although new orders were not very plentiful. Specifications from the automotive industry, which slowed down for the inventory period, have improved, and mills have good tonnage on their books for that industry for January shipment. Some additional buying is being done by the motor car builders, and most of them are covered for their requirements for several weeks, or the first quarter. Consumers have taken out most of the steel on their fourth quarter contracts, and mills are not disposed to cancel uncompleted contracts even if taken at lower than the present prices. This means that some steel bars at 1.90c., Pittsburgh, will be carried over to the first quarter. In spite of the stronger tone that has developed in the plate market, plates can still be bought at 1.85c., Pittsburgh, for the first quarter, and a current order for a round lot might be placed at 1.80c. The recent locomotive business has stimulated the demand for plates. Among new inquiries is one for 400 tons for tanks. Steel bars are firm at 2c., Pittsburgh, and mills, in some cases, are able to get 2.10c. for less than car lots. There is an increase in structural activity in the Detroit territory, but locally new inquiry is light.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 3.95c.; No. 28 galvanized sheets, 5.10c.; No. 10 blue annealed sheets, 3.15c.; cold-rolled rounds and hexagons, 3.90c.; flats and squares, 4.40c.; hoops and bands, 3.85c.; No. 9 annealed wire, \$3 per 100 lb.; No. 9 galvanized wire, \$3.45 per 100 lb.; common wire nails, \$3 base per 100 lb.

Pig Iron.—Furnaces are getting good orders on first quarter contracts and expect that shipments in a few days will be back to where they were before the holiday lull. Suspensions have been fewer and for shorter periods than usual during inventory time. Holiday dullness has prevailed the past week, with sales limited to small lots. Cleveland producers booked 6000 tons in foundry and malleable grades. Prices show no change. For delivery in Cleveland and surrounding territory, \$20.50, Valley furnace, is the ruling price for foundry and malleable iron. In western Ohio, Michigan and eastern Ohio, the usual price is \$23, Lake furnace. The McKinney Steel Co. blew in a furnace, Dec. 23, and now has all of its four river furnaces in blast.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6.01 from Birmingham.

Basic, Valley furnace	\$20.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	22.26
Southern fdy., sil. 1.75 to 2.25	\$27.01 to 28.01
Malleable	22.26
Ohio silvery, 8 per cent.	32.52
Standard low phos., Valley furnace	28.00 to 28.50

Semi-Finished Steel.—Plate makers with non-integrated plants do not see much chance of profitable operation with the present narrow spread between slabs and plates, and a northern Ohio mill that is in the market for the first quarter is trying to bring out a lower price than \$35 for slabs. However, the market is firm at that price, f.o.b. Youngstown, for both slabs and billets, and at \$36 for sheet bars. The situation appears well balanced in respect to supply and demand. Mills are comfortably filled, and consumers are well covered so that there is virtually no new inquiry.

Coke.—The increased demand for domestic coke and the cold weather have caused a sharp advance in prices, which are now close to the peak of a few weeks ago. By-product coke for domestic use sold during the week at \$9, ovens. Connellsville foundry coke ranged from \$5.50 to \$6, ovens, although some producers have withdrawn prices. By-product foundry coke prices for January are the same as for December, being \$8.50, ovens, for Painesville coke and \$7.50 for Ashland coke.

Sheets.—Mills are getting a good volume of specifications from automobile companies and other consumers for January shipment, and most of them have well filled order books for next month. Mills are holding well to regular quotations, but concessions of \$2 a ton are being made by some jobbers having low-priced contracts. Most buyers have specified the full tonnage on their low-price contracts, and some of the mills are declining to accept orders on unfilled contracts that were not received in time for December rolling.

Alloy Steel.—The price advance of a few weeks ago appears to be holding on first quarter business, as some round-lot buyers have tested the market recently but have failed to secure concessions from the regular quotations.

Reinforcing Bars.—Inquiry is very light, as is usual at this time of the year, and producers are making little effort to get above 1.80c., mill, for rail steel bars.

Bolts, Nuts and Rivets.—The demand for bolts and nuts on contracts is holding up well for this period of the year. Rivet specifications against contracts have improved. Makers are booking considerable business for the first quarter in contracts at \$2.60, Pittsburgh.

Fluorspar.—We note the sale of 2000 tons of ground fluorspar for 1926 delivery, at the ruling quotation of \$32.50, mines. The supply of No. 2 lump material is scarce, and this grade has advanced \$1 to \$20, mines. Gravel fluorspar is quiet, few consumers having placed contracts for next year. The market on this grade is firm at the recent advance.

Old Material.—There is virtually no trading in scrap, and shipments have been reduced to about 20 per cent of the usual amount because of suspensions by most of the consumers during the holiday period. The amount of scrap that is coming on the market has been materially reduced by the slowing down in operations of producers' plants, particularly those of the Detroit automobile companies. January lists sent out by the motor car builders include 5000 tons offered by Dodge Brothers, Inc., and 1600 tons by the Chrysler Motor Corporation. The Dodge list includes 700 tons of short shoveling turnings, 750 tons of cast iron borgings, 1000 tons of compressed steel and 900 tons of drop forge flashings. Prices are unchanged.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	\$17.00 to \$17.50
Rails for rolling	16.75 to 17.00
Rails under 3 ft.	19.50 to 20.00
Low phosphorus melting	19.00 to 19.25
Cast iron borgings	14.00 to 14.50
Machine shop turnings	13.50 to 14.00
Mixed borgings and short turnings	14.00 to 14.50
Compressed sheet steel	15.50 to 16.00
Railroad wrought	14.50 to 15.00
Railroad malleable	20.50 to 21.00
Light bundled sheet stampings	12.50 to 12.75
Steel axle turnings	15.25 to 15.50
No. 1 cast	18.00 to 18.50
No. 1 busheling	14.25 to 14.50
Drop forge flashings	14.75 to 15.00
Railroad grate bars	13.75 to 14.00
Stove plate	13.75 to 14.00
Pipes and flues	11.50 to 12.00

Look for Active Buying of Scrap

DETROIT, Dec. 28.—While shipments of pig iron have been held up generally until Jan. 2, recent releases for castings from two of the largest producers of automobiles show a production schedule equal to the high November rate. Melting plants have practically clean yards. Stove, furnace and radiator plants are scheduled to manufacture on a capacity basis during the first quarter. Prices are the same as quoted a week ago.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate. No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	\$14.75 to \$15.25
Borings and short turnings	11.50 to 12.00
Long turnings	10.75 to 11.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	23.00 to 24.00
Hydraulic compressed	13.75 to 14.25
Stove plate	13.50 to 14.50
No. 1 busheling	13.25 to 13.75
Sheet clippings	9.50 to 10.00
Flashings	12.25 to 12.75

Philadelphia

Year Ends with Eastern Steel Mills and Blast Furnaces in Sound Position

PHILADELPHIA, Dec. 28.—As 1925 draws to a close, Eastern steel companies and blast furnace operators have every reason to feel satisfied not only with their present position but also as regards the outlook for at least the first half of 1926. Seldom has the iron and steel industry entered upon a new year with more elements in its favor. Orders and specifications for steel in the past week have been fairly heavy, while in pig iron some consumers have been asking the furnaces to anticipate their first quarter shipments, indicating that the melt is greater than was expected when purchases were made.

The development of the week likely to be of immediate significance is the conference which will probably result in an ending of the strike of anthracite coal miners. It is recognized that not very much anthracite coal will be shipped for a few weeks, even if the miners return to work at once, but the sentimental effect of a strike settlement is expected to be felt immediately, especially in the coke market. Prices for crushed coke for heating purposes again skyrocketed this week to \$9 and \$10 a ton, Connellsville ovens, but an easing of all coke prices is looked for when the coal strike ends. In view of the well sold condition of the blast furnace, it is the belief in the pig iron trade that iron prices will not be affected.

The Pennsylvania Railroad has asked steel companies for prices on plates, shapes, bars and other products covering its first quarter requirements, but there was nothing given out to indicate how large a tonnage will be purchased. An announcement is expected shortly giving details of the Pennsylvania's large program for expansion which, it was said some time ago, would involve an expenditure of \$50,000,000 in 1926.

Pig Iron.—An indication of the underlying soundness of the pig iron situation lies in the frequent requests from melters in the past week to hurry shipments and to anticipate deliveries on first quarter contracts. This clearly shows that iron is going into consumption at a rate faster than was expected when fourth quarter contracts were placed. Prices on all grades are firm and eastern Pennsylvania furnaces have good order books for the first quarter. An Eastern steel company is in the market for 6000 tons of basic for first quarter and probably will buy at \$22, furnace, or slightly over \$23 delivered. Foundry iron is quoted at \$23, furnace, though on some small lots 30c. a ton higher has been obtained.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$23.76 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.26 to 24.63
East. Pa. No. IX.....	24.76 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic, delivered eastern Pa.	23.00 to 23.50
Gray forge	23.00 to 23.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. fur- nace)	24.00 to 25.00
Copper bearing low phos. (f.o.b. furnace)	24.50

Ferroalloys.—Consumers of ferromanganese are holding back on purchases for first quarter. The current volume of business is small. Importers and the domestic maker continue to quote \$115, seaboard or furnace.*

Billets.—Eastern mills now name \$36, Pittsburgh, as minimum for rerolling billets and \$41, Pittsburgh, on forging billets. Recent sales have been on the basis of \$35 and \$40.

Plates.—Eastern plate mills are in the best situation of the year. They enter the new year with a larger tonnage of orders than they have had in some time. They have also succeeded in getting prices up, and the

minimum now seems to be 1.75c., Pittsburgh, with 1.80c. quoted on a majority of the inquiries.

Structural Material.—There is seasonal inactivity in structural steel, which is usual at this time of year, but there is a good deal of tonnage pending on which action will probably be taken early in the new year. Miscellaneous orders and specifications on contracts, however, have made a fairly good volume in the week. The Phoenix Bridge Co. was low bidder on 6500 tons of subway work for New York. The market price on shapes is generally recognized as 1.90c., Pittsburgh, but there are some sales both below and above that figure.

Bars.—Bar mills will have substantial rollings in January. Some of the fourth quarter tonnage has only recently been specified and will carry over into the new year. While first quarter contracts have been made at 2c., Pittsburgh, a good deal of the carry-over tonnage was sold at 1.90c. Bar iron is in fair demand, with the price unchanged at 2.22c., Philadelphia.

Sheets.—Less is being heard of concessions on sheets. Most of the mills quote 2.50c. on blue annealed, 3.35c. on black and 4.60c. on galvanized, Pittsburgh basis.

Warehouse Business.—Although there is some irregularity in prices quoted by local warehouses, with concessions here and there, the following quotations represent what most of them are naming for local delivery:

Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x 1½ in., 3.50c.; round edge steel, planished, 4.30c.; tank steel plates, ¼ in. and heavier, 2.80c. to 3c.; tank steel plates, ½ in., 3c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.65c.; galvanized sheets, No. 28 gage, 5.85c.; square, twisted and deformed steel bars, 3c.; structural shapes, 2.75c. to 2.90c.; diamond pattern plates, ¼ in., 5.30c.; ½ in., 5.50c.; spring steel, 5c.; rounds and hexagons, cold-rolled steel, 4c.; squares and flats, cold-rolled steel, 4.50c.; steel hoops, 4.25c., base; steel bands, No. 12 gage to ½ in., inclusive, 3.90c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 6.50c.

Imports.—The only importation of pig iron last week was 1415 tons from India. Other imports were: Iron ore from Sweden, 7037 tons; ferromanganese from India, 1250 tons; ferroalloys from Switzerland, 49 tons; hoop steel from England, 22 tons.

Old Material.—The scrap market is firmer, and while there have been only one or two price advances the attitude of brokers is such that higher prices will be quoted on any inquiries that may be received. The price views of brokers are fully 50c. a ton higher than today's quotations. Meanwhile the market is very quiet. Small sales of heavy melting steel have been made at \$17.50 and \$18; blast furnace borings and turnings are slightly higher at \$14 to \$14.50, and No. 1 cast scrap ranges from \$18.50 to \$19.50, a 50c. advance.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	\$17.50 to \$18.00
Scrap rails	17.00 to 17.50
Steel rails for rolling	18.50 to 19.00
No. 1 low phos. heavy 0.04 and under	22.00 to 22.50
Couplers and knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Cast iron car wheels	18.50 to 19.00
No. 1 railroad wrought	18.50 to 19.00
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	15.50 to 16.00
Bundled sheets (for steel works)	14.50 to 15.00
Mixed borings and turnings (for blast furnace)	14.00 to 14.50
Machine shop turnings (for steel works)	14.50 to 15.00
Machine shop turnings (for roll- ing mill)	15.00 to 15.50
Heavy axle turnings (or equiv- alent)	15.50 to 16.00
Cast borings (for steel works and rolling mill)	14.50 to 15.00
Cast borings (for chemical plant)	17.00 to 17.50
No. 1 cast	18.50 to 19.50
Heavy breakable cast (for steel works)	17.50 to 18.00
Railroad grate bars	15.00
Stove plate (for steel works)	15.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	23.00 to 24.00
Steel axles	24.00 to 25.00

Buffalo

Buffalo Merchant Furnace Is Blown In— Borings and Turnings in Demand

BUFFALO, Dec. 28.—The pig iron market is firm, but there is little purchasing owing to holiday inactivity and the fact that foundries are covered for the first quarter. Shipments are going forward without diminution and the Rogers-Brown Iron Co. has blown in a third furnace. Pending inquiry totals 1000 tons. No. 2 plain foundry and malleable are firm at \$21 to \$22, Buffalo, and basic at \$20.50.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25.....	\$21.00 to \$22.00
No. 2X foundry, sil. 2.25 to 2.75.....	21.50 to 22.50
No. 1 foundry, sil. 2.75 to 3.25.....	22.50 to 23.50
Malleable, sil. up to 2.25.....	21.00 to 22.00
Basic	20.50 to 21.00
Lake Superior charcoal	29.28

Finished Iron and Steel.—Mills are loaded with tonnage and are operating at 85 to 90 per cent of capacity. Bars are strong at 2.265c., Buffalo, and shapes at 2.165c. to 2.265c. Plates are also stronger, and the sheet market is firm at 3.35c. to 3.40c., base Pittsburgh, for black, and 4.60c. for galvanized. Demand for semi-finished is improving and some future buying is being done.

Warehouse prices are being quoted as follows: Steel bars, 3.30c.; steel shapes, 3.40c.; steel plates, 3.40c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized, 5.75c.; cold-rolled shapes, 4.45c.; cold-rolled rounds, 3.95c.; wire nails, 3.90c.; black wire, 3.90c.

Old Material.—Demand for borings and turnings and mixed borings and turnings for blast furnace consumption have featured the old material market. Some dealers with orders at \$14, paid \$14.50 and even \$14.75, to cover. There has been considerable let-up in the production of these grades because of the inactive period in industrial operations at the end of the year, and the market is firm at \$13.50 to \$14 for turnings, and \$13.50 to \$14.50 for borings. A large mill is buying heavy melting steel at \$18, but would probably have to pay between \$18.50 to \$19 for a large tonnage. Small purchases of low phosphorus have taken place at \$21 to \$22.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	\$18.50 to \$19.00
Low phosphorus	20.00 to 21.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	17.50 to 18.00
Machine shop turnings	13.50 to 14.00
Mixed borings and turnings	13.50 to 14.00
Cast iron borings	13.50 to 14.00
No. 1 busheling	17.50 to 18.00
Stove plate	15.00
Grate bars	14.50 to 15.00
Hand bundled sheets	13.00 to 13.50
Hydraulic compressed	17.50 to 18.50
No. 1 machinery cast	17.50 to 18.00
Railroad malleable	20.00 to 21.00
No. 1 cast scrap	17.50 to 18.00
Iron axles	26.00 to 27.00
Steel axles	20.00 to 21.00

Toronto

Canadian Scrap Market Stagnant— Holidays and Inventories Factors

TORONTO, ONT., Dec. 28.—Trading in iron and steel scrap in the Canadian market has reverted to a state bordering on stagnation during the past week or ten days. This lack of demand is not due to a falling off in consumption, but is the result of the Christmas holiday season, the fact that most consumers are covered for the remainder of the year, and the approaching inventory period. Mills are large users of scrap at the present time, and dealers have delivered large tonnages of old material into the Hamilton district. Foundries report no change in their daily melt with a consequent low consumption of old material. In the Montreal district business is dull with light demand for scrap for

domestic consumption, as well as for export. Trading between dealers has fallen off as a consequence of the limited resale demand, and speculative buying has entirely disappeared. While dealers report a dull market, they are careful to point out that it is seasonable and all are of the opinion that the turn of the year will see a revival of business. Prevailing dealers' buying prices are as follows:

	Gross Tons	Toronto	Montreal
Steel turnings	\$10.00	\$7.50	
Machine shop turnings	10.00	7.50	
Wrought pipe	7.00	6.50	
Rails	11.00	10.00	
No. 1 wrought scrap	12.00	13.00	
Heavy melting steel	11.00	10.00	
Steel axles	16.00	17.00	
Axes, wrought iron	18.00	19.00	
	Net Tons		
Standard car wheels	16.00	15.00	
Malleable scrap	14.00	13.00	
Stove plate	13.00	13.00	
No. 1 machinery cast	17.00	16.00	

Cincinnati

Silvery Advances—Ashland Furnace to Blow in—Scrap Dull

CINCINNATI, Dec. 28.—Consumers are manifesting little interest in pig iron and sales the past week were confined almost exclusively to small tonnages. Furnaces in the Ironton district are holding to \$21, base Ironton, for foundry iron. While Tennessee iron is available at \$22, base Birmingham, all of the Alabama merchant furnaces, with comfortably filled order books for the first quarter, continue to be temporarily out of the market. Jackson County silvery and Bessemer ferrosilicon grades will advance \$1 a ton on Jan. 1, thereby making 8 per cent \$30.50, furnace. The Norfolk & Western Railway is reported to have bought 1100 tons of foundry iron from a Virginia furnace. The Louisville & Nashville Railroad has closed for 575 tons of Southern iron. An inquiry for 4000 tons of malleable for a melter in this territory is pending, while another consumer is in the market for 800 tons of silvery. Sellers state that buyers are accepting iron freely and it is only on rare occasions that suspension of shipments is sought. The second furnace of the American Rolling Mill Co. at Ashland, Ky., will be blown in on basic iron Jan. 1.

Based on freight rates of \$3.69 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:	
Alabama fdv., sil. 1.75 to 2.25 (base)	\$25.69
Alabama fdv., sil. 2.25 to 2.75	26.19
Tennessee fdv., sil. 1.75 to 2.25	25.69
Southern Ohio silvery, 8 per cent	31.77
Southern Ohio fdv., sil. 1.75 to 2.25	\$23.27 to 23.77
South'n Ohio, malleable (nominal)	23.27

Finished Material.—Less interruption to the normal flow of business than ordinarily occurs at Christmas has been the outstanding feature. Specifications and orders have decreased slightly, but have been sufficiently heavy to insure December a position among the better months of the year. Sellers are deriving satisfaction from the fact that buying is well distributed among numerous industries. The bar tonnage for the week was moderate in volume. Quotations remain at 2c. to 2.10c., base Pittsburgh. The plate market is stronger with 1.90c. to 2c., base Pittsburgh, the prevailing range of prices. Shapes are in better demand, but most sales are at 2c., base Pittsburgh, even though several mills are consistently quoting 2.10c. Sheet specifications have been moderate in volume. Black sheets are firm at 3.35c., Pittsburgh, while blue annealed sheets range from 2.50c. to 2.60c., Pittsburgh, with at least one seller holding to the latter figure and expressing indifference whether further business is taken in the next few weeks, because of the accumulation of orders for early delivery. Consumers are reluctant to contract for automobile sheets at the new prices of 4.50c., Pittsburgh, and consequently they have postponed buying on an extensive scale. Purchases of wire goods continue at a fair rate, with common wire nails bring-

ing \$2.65 per keg, Pittsburgh or Ironton, and plain wire \$2.50 per 100 lb., Pittsburgh or Ironton. Jobbers have been ordering fencing for the spring trade in considerable volume. The Big Four railroad is in the market for its first quarter requirements in wire goods. There has been a marked increase in structural jobs, and fabricators are bidding on more projects than at any time since September.

Reinforcing Bars.—The development of several attractive projects has aroused interest, and two important awards are expected in the coming week. No change has occurred in prices, with new billet bars selling at 2c., Cleveland, and rail steel bars at 1.90c., mill.

Warehouse Business.—While the volume of business declined considerably during the past week, sales during the entire month of December have attained satisfactory proportions. Prices are steady, and are expected to remain at the present level during the coming month.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4c. to 4.25c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds and hexagons, 3.85c.; squares, 4.35c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.10c. to 4.30c.; No. 28 galvanized sheets, 5.25c. to 5.40c.; No. 9 annealed wire, \$3 per 100 lb.; common wire nails, \$2.95 per keg base; cement coated nails, \$2.25 per keg; chain, \$7.55 per 100 lb. base; large round head rivets, \$3.75 base; small rivets, 65 per cent off list. Boiler tubes: prices net per 100 ft. lap-welded steel tubes, 2-in., \$18; 4-in., \$38; seamless, 2-in., \$19; 4-in., \$39.

Coke.—The total shipments of by-product foundry coke in December, slightly exceeded those of November, but the movement of by-product domestic grades fell off about 10 per cent. An important by-product coke company has just closed the best quarter in its history and has heavy bookings scheduled for January and February delivery. Announcement has been made that by-product foundry and domestic prices, which are \$10.64 and \$8.64, delivered Cincinnati, respectively, will remain unchanged throughout January. Several attractive lots of Alabama by-product domestic grades have been sold in Michigan. The Louisville & Nashville Railroad is reported to have purchased 800 tons of Wise County foundry coke. A nearby consumer is inquiring for 600 tons of furnace coke.

Based on freight rates of \$2.14 from Ashland, Ky., \$3.53 from Connellsville, and \$2.59 from New River and Wise County ovens, we quote f.o.b. Cincinnati: Connellsville foundry, \$8.53 to \$9.53; Wise County foundry, \$8.09 to \$9.59; New River foundry, \$9.59 to \$10.59; by-product foundry, \$10.64.

Old Material.—With consumers refusing to buy except at extremely low prices, the market has been quiet. Dealers' yards are well filled with stock purchased in the past few months in anticipation of a rise in the market which has failed to materialize. Prices are fairly firm, with heavy melting steel selling at \$14.50 to \$15. The Big Four railroad has a small list which will close Dec. 31.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton

Heavy melting steel	\$14.50 to \$15.00
Scrap rails for melting	14.50 to 15.00
Short rails	18.50 to 19.00
Relaying rails	27.50 to 28.00
Rails for rolling	15.50 to 16.00
Old car wheels	14.00 to 14.50
No. 1 locomotive tires	17.00 to 17.50
Railroad malleable	16.00 to 16.50
Agricultural malleable	15.50 to 16.00
Loose sheet clippings	9.50 to 10.00
Champion bundled sheets	11.50 to 12.00

Per Net Ton

Cast iron borings	9.50 to 10.00
Machine shop turnings	8.00 to 8.50
No. 1 machinery cast	20.00 to 20.50
No. 1 railroad cast	16.00 to 16.50
Iron axles	23.00 to 23.50
No. 1 railroad wrought	12.00 to 12.50
Pipes and flues	9.50 to 10.00
No. 1 busheling	11.00 to 11.50
Mixed busheling	9.50 to 10.00
Burnt cast	10.00 to 10.50
Stove plate	11.00 to 11.50
Brake shoes	11.00 to 11.50

GOOD YEAR FOR RAILROADS

Ten New Operating Records Established in Handling Heaviest Freight Traffic

Operating with the greatest economy and efficiency in history, 10 new operating records were established in 1925 by the railroads in this country in handling the largest freight traffic that has ever been offered to them by shippers, according to a report for the year which was submitted recently to a meeting of the board of directors of the American Railway Association at the Blackstone Hotel, Chicago.

This report states further that it is estimated that for the entire year 50,900,000 cars will have been loaded with revenue freight, exceeding 1924 by nearly 2,500,000 cars, or 5 per cent.

The net operating income of the Class 1 railroads in 1925 was approximately \$1,125,000,000, or approximately 4.8 per cent on their property investment. This is based on complete reports for the first 10 months, which showed a net operating income of \$935,047,500, or 4.83 per cent, and an estimate made by the Bureau of Railway Economics as to their earnings in November and December. Class 1 carriers in 1924 had a net operating income of \$987,133,417, or 4.33 per cent.

The rate of return on the basis of property investment by years is as follows: 1920, 0.09 per cent; 1921, 2.92 per cent; 1922, 3.61 per cent; 1923, 4.48 per cent; 1924, 4.33 per cent; 1925, estimated at 4.80 per cent.

Railroad taxes, including Federal, State and local, amounted to \$360,000,000 in 1925, the highest for any one year on record. This is an average of nearly \$1,000,000 per day.

Less fuel was consumed during the year in proportion to the amount of freight traffic handled than ever before, there having been an average for the first 10 months of 1925 of 138 lb. used to move 1000 gross tons of freight and equipment one mile, compared with 148 lb. in 1924, and 160 lb. in 1923.

The scope of the instruction given in the subject of personnel relations by American schools of engineering and colleges of business administration has been investigated by the committee on relations with colleges of the American Management Association. A comprehensive report has been published in a booklet of 168 pages, 6 by 9 in., under the title of "Personnel Administration in College Curricula." Opinions of leaders in industry and education are included and there are outlines of the courses given in a number of schools. The headquarters of the association is 20 Vesey Street, New York.

Industrial consumption of both anthracite and bituminous coal in November declined 25 per cent from the October level, according to the National Association of Purchasing Agents. This counteracts, to a certain extent, the estimated 26 per cent increase during October over the September figure. The statistics for November indicate that industrial coal consumption, estimated at 37,464,000 tons, receded to within 3,000,000 tons of the September figure.

Output of bituminous coal in the week ended Dec. 5 reached 12,897,000 net tons, a gain of 1,297,000 tons from the preceding week, which included Thanksgiving day. The gain over the week ended Nov. 21 was 301,000 tons, according to figures of the National Coal Association, Washington.

The J. G. White Engineering Corporation, New York, has sent a construction organization to Liberia, Africa, where it will construct a harbor, breakwater, docks, roads, etc., for the government of Liberia. The necessary equipment for this work has been purchased and shipped. Native labor will be employed.

FABRICATED STEEL

Seasonal Inactivity in Structural Lettings Reflected in the Week's Low Total

About 21,000 tons of fabricated steel work was contracted for in the past week, a let-down which is not unusual at this time of year. Of this total, 6500 tons is for New York subway work on which the Phoenix Bridge Co. was low bidder. The jobs which have come up for bids in the past week total 15,000 tons, the largest inquiry being 5500 tons for the Michigan Telephone Co. building, Detroit. The awards follow:

Ford Motor Co., extension to plant at Jacksonville, Fla., 350 tons, to Virginia Bridge & Iron Co.

Pere Marquette Railroad, grade crossing elimination, 135 tons, to American Bridge Co.

Cadillac Motor Car Co., Detroit, 250 tons, to McClintic-Marshall Co.

S. S. Kresge Co., building at Columbus, Ohio, 470 tons, to McClintic-Marshall Co.

Chicago, Rock Island & Pacific, 112-ft. through plate girder span, Marengo, Iowa, 180 tons, to American Bridge Co.

New York subway work, 6500 tons; Phoenix Bridge Co. low bidder.

United Gas Improvement Co., Philadelphia, office building, 1750 tons, to McClintic-Marshall Co.

Pennsylvania Railroad, bridge, 650 tons, to American Bridge Co.

City of New York, subway section 2, route 105, 3750 tons, to American Bridge Co.

New York-New Jersey vehicular tunnel, building work, 2400 tons, to Phoenix Bridge Co.

Fort Anne, N. Y., highway bridge, 300 tons, to American Bridge Co.

Tuckahoe, N. J., highway bridge, 250 tons, to American Bridge Co.

Big Four Railroad, six bridges, 530 tons, to McClintic-Marshall Co.

Louisville & Nashville Railroad, turntable, 100 tons, to American Bridge Co.

Ward Baking Co., Pittsburgh, 700 tons, to American Bridge Co.

Cascade Locks Bridge, Columbia River, Wash., 1500 tons, to Wallace Equipment Co., Seattle.

Hartford Fire Insurance Co., California Street, San Francisco, 575 tons, to California Steel Co., San Francisco.

Miner Street subway, Stockton, Cal., 130 tons, to California Steel Co.

Union Oil Co., San Francisco, tanks, 150 tons, to Western Pipe & Steel Co. of California, San Francisco.

Shell Oil Co., San Francisco, 400 tons, to Steel Tank & Pipe Co., Berkeley, Cal.

Structural Projects Pending .

Inquiries for fabricated steel work include the following:

National City Bank, Troy, N. Y., 200 tons.

Florida East Coast Railway, St. Augustine shops, 2000 tons.

Columbus, Ohio, office building, 1500 tons.

Mengel Co., Louisville, plant addition, 350 tons; bids in.

Mobile Bay Bridge, Mobile, Ala., 800 tons.

Pier shed, San Pedro, Cal., 490 tons.

Wahiaawa Bridge, Honolulu, H. I., 220 tons.

United States Engineers' Office, San Francisco, 110 tons; Pacific Coast Engineering Co. low bidder.

Chicago, Rock Island & Pacific, 900 tons for track elevation at Chicago.

Garfield junior high school, Johnstown, Pa., 1500 tons.

Municipal stadium, Johnstown, Pa., 1200 tons.

School of Practice, Thirteenth and Spring Garden Streets, Philadelphia, tonnage not stated.

Jeannes Hospital, Philadelphia, administration building, nurses' home and power house, tonnage not stated.

Michigan Bell Telephone Co., Detroit, telephone exchange building, 5500 tons; bids received.

High school, Detroit, 400 tons.

LARGE EXPORTS IN 1925

Automobile Shipments Make New High Record —Heavy Cotton and Copper Movements

WASHINGTON, Dec. 28.—Exports of the United States for the first nine months of this year were greater than those of any full year before 1916, according to a report made public today by the Foreign Commerce Department of the Chamber of Commerce of the United States. The report points out that "total exports for the first nine months of 1925 amounted to \$3,500,000,000, which averages \$389,000,000 monthly. This is 12 per cent greater than a year ago."

"When the figures for the best months of the year, October, November and December, become available, the value of our exports for 1925 will be found close to \$5,000,000,000—a figure reached only in the war and postwar years 1916 to 1920. Since 1920 the general trend of exports has been upward, with the tendency since December, 1923, more sharply upward than theretofore."

High Records in Automobiles

"High levels, in some cases new records, were reached in both quantity and value by some of our leading exports. Shipments of raw cotton for the January-September period of 1925 totaled more than 2,500,000,000 lb., nearing the high figure of 1912, the year of our second greatest crop. In value our cotton exports were exceeded only by the high-priced cotton for 1919 and 1920, when raw cotton topped 40c."

"Records were made in automobile exports, with shipments of 218,471 cars and chassis, valued at \$162,090,000, figures never equaled in volume or value. Wherever the American automobile goes, there we find American gasoline. Exports of gasoline, naphtha and other light products also exceeded those of all previous nine-month periods, with total shipments of 937,000,000 gal., valued at \$147,000,000."

"Exports of refined copper for the first three-quar-

ters of 1925 amounted to 789,000,000 lb., only about 200 tons smaller than the record shipments in 1917. The value, \$114,000,000, was exceeded only by the war values of 1916-1918."

International Critical Tables

Numerical data of physics, chemistry and technology are about to be published in a five-volume work by the National Academy of Sciences and the National Research Council of the United States, Washington. Chemists, physicists, engineers and other experts to the number of 300 have collaborated in collecting and preparing the material. These men represent not only the United States but Canada, England, Belgium, France, Italy, Germany, Austria, Denmark, Switzerland, Holland, Australia and Japan.

All available information of value will be included concerning the physical properties and numerical characteristics of many materials. These include pure substances, mixtures of definite composition, important classes of industrial materials, many natural materials and products, and selected data for selected bodies or systems, such as the earth and its main physical subdivisions and the solar and stellar systems. The five volumes will comprise about 2500 pages and will be sold as a set.

Coke Oven Accidents

Fatal accidents at coke ovens in the United States in 1924 resulted in the death of 24 men. Except for 1921, when production was at a minimum, this is the smallest number of fatalities for a considerable period of years. It compares with 45 in 1923 and with about 75 in each of the war years. Total injuries, not fatal, at 1645 in 1924, were the lowest for any year for a considerable period. During the war the figure averaged over 7000, while in 1923 it was 2593. Men employed in 1924 numbered 20,451.

Where Steel Exports Went in November

Canada Took 330,359 Tons of Nine Leading Items in Eleven Months—Japan Regains Second Position with 84,812 Tons, Followed by Cuba, 82,855 Tons—Argentina Took 52,562 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

	Steel Plates				Galvanized Sheets				Black Steel Sheets			
	November 1925		Ended November 1924		November 1925		Ended November 1924		November 1925		Ended November 1924	
Total	10,983	4,094	9,4510	80,277	15,607	11,062	147,857	99,982	11,281	12,484	8,4974	141,147
Canada	8,527	3,156	73,683	62,686	1,558	1,080	23,176	16,456	4,017	3,790	40,042	35,070
Japan		35	916	611	333	533	3,806	12,547	5,706	8,040	31,385	96,482
Cuba	164	52	1,195	1,310	1,218	891	10,690	10,910	32	17	1,065	832
Philippine Islands	243	...	487	1,425	1,933	1,355	16,298	13,024	...	...	138	...
Mexico	270	9	1,291	671	420	720	6,791	5,447	...	...	105	747
Argentina . . . . .	...	...	...	...	550	3,618	35,149	14,309	...	...	174	...
Chile . . . . .	...	...	...	...	573	27	2,156	1,237	...	...	...	...
Colombia . . . . .	...	...	...	...	973	746	2,799	3,771	...	...	...	...
Central America . . . . .	...	...	...	...	...	418	...	4,183	...	...	...	...

	Steel Rails				Barbed Wire				Plain and Galvanized Wire			
	Eleven Months November 1925		Ended November 1924		Eleven Months November 1925		Ended November 1924		Eleven Months November 1925		Ended November 1924	
Total	7,136	14,515	147,406	185,631	5,889	7,413	65,244	83,886	2,215	2,242	32,775	35,555
Canada	225	527	20,041	17,312	262	1,604	1,888	3,334	755	340	12,843	7,863
Japan	1,856	—	9,915	32,470	—	—	—	—	207	641	4,049	—
Cuba	1,559	1,386	35,370	45,123	437	298	4,015	7,362	135	111	2,075	1,622
Philippine Islands	440	3,378	5,763	—	—	—	1,140	—	15	—	894	—
Mexico	128	286	4,889	8,330	308	356	4,940	3,561	385	168	1,177	3,428
Argentina	—	—	—	—	1,070	537	9,245	9,782	128	—	1,162	3,541
Chile	422	—	6,028	9,102	—	—	—	20	—	1	—	27
Colombia	325	66	2,189	10,036	624	1,016	4,730	6,599	—	—	110	—
Brazil	55	—	6,085	10,339	740	1,795	16,627	27,929	—	170	—	7,391
Chosen	—	—	—	36	—	—	—	—	—	—	—	—
Honduras	10	—	1,324	3,517	—	—	—	—	—	—	—	—
Australia	—	—	—	—	—	140	—	2,929	175	394	2,278	2,553
British S. Africa	—	5,798	—	5,798	—	215	—	4,543	—	—	—	—

*Exports of Iron and Steel From the United States by
Countries of Destination, November, 1925*

(In Gross Tons)

Belgium	206	Newfoundland and Labrador	185	Straits Settlements	721
Czechoslovakia	1	Bermuda	23	China	6,975
Denmark	74	Barbados	2	Chosen	6
Finland	50	Jamaica	175	Java and Madura	1,717
France	1,573	Trinidad and Tobago	751	Other Dutch East Indies	3,038
Germany	287	Other British West Indies	636	Hejaz, Arabia, etc.	13
Greece	716	Cuba	11,310	Hongkong	163
Italy	276	Dominican Republic	691	Japan	16,610
Netherlands	64	Dutch West Indies	169	Kwantung, Ieased territory	26
Norway	288	Haiti	119	Palestine and Syria	29
Poland and Danzig	40	Virgin Islands of U. S.	19	Persia	113
Portugal	17	American Islands	14,082	Philippine Islands	3,913
Rumania	166	Argentina	5,038	Siam	25
Russia in Europe	42	Bolivia	89	Turkey in Asia	384
Spain	81	Brazil	3,052	Asia	38,408
Sweden	126	Chile	3,486	Australia	1,597
Switzerland	7	Colombia	9,303	British Oceania	6
Turkey in Europe	567	Ecuador	146	French Oceania	6
United Kingdom	5,111	British Guiana	12	New Zealand	250
Europe	9,692	Dutch Guiana	183	British West Africa	7
Canada	68,826	Paraguay	6	British South Africa	399
British Honduras	6	Peru	2,110	British East Africa	1
Costa Rica	117	Uruguay	361	Egypt	539
Guatemala	562	Venezuela	3,670	Liberia	2
Honduras	401	South America	27,456	Morocco	29
Nicaragua	788	British India	4,674	Portuguese East Africa	89
Panama	919	Ceylon	1	Total	171,134
Salvador	1,093				
Mexico	5,859				
North America	78,571				
Miquelon and St. Pierre Islands	2				

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

Dec.	Copper, New York		Tin		Lead		Zinc		
	Electro- lytic*		(Spot)		New York	New York	St. Louis	New York	St. Louis
	Straits								
23.....	14.25	13.87½	62.80	9.25	9.00	8.95	8.60		
24.....	14.25	13.87½	63.25	9.25	9.00	8.97½	8.62½		
28.....	14.25	13.87½	63.37½	9.25	9.00	8.97½	8.62½		

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Dec. 28.

Because of the holidays all the markets are quite inactive. In most cases prices are unchanged and the markets are firm. The tone of the copper market is better. There has been moderate buying of tin with slightly higher prices. Conditions in the lead market are unchanged. Quotations for zinc have remained practically stationary with very little buying.

Copper.—As 1925 draws to a close a considerably better tone pervades the copper market. The year will be the largest ever recorded in shipments of American copper and statistically the industry is in a strong position. Stocks of refined copper are not large but buying by Europe has been so small in recent months that the price of copper has been lower during December than the high points of the year. There is very little inquiry from domestic consumers and prices today are about the same as a week ago at 14.12½c. to 14.25c., delivered. Some producers are insisting on the higher quotations, but the metal can be obtained at the lower. Producers look forward to a stronger market in January, particularly if demand from Europe reappears. Lake copper is quoted at 14.25c., delivered.

Tin.—The week has been a decidedly quiet one, especially since just before the Christmas holiday. The most active day was on Dec. 23, when 500 to 600 tons changed hands. Most of this was taken by consumers and it involved January-February shipment out of New York, though a little was sold for later deliveries. The markets were all closed on Saturday, Dec. 26, and today there has been very little business. Spot Straits tin was quoted today at 63.37½c., New York. London quotations today were £3 to £5 per ton higher than a week ago, at £289 for spot standard, £281 5s. for future standard and £290 for spot Straits. The Singapore price was £287 15s. Arrivals thus far this month have been 5955 tons, with 5515 tons reported afloat.

Lead.—Sales of the metal for January are reported as already large and, as a consequence, the market is a little stronger. Quotations, however, remain practically the same as a week ago, with the leading interest still quoting 9.25c., New York, as its contract price. In the outside market quotations are 9c. to 9.10c., St. Louis, or 9.30c. to 9.45c., New York.

Zinc.—Prime Western zinc for December continues scarce with premium quotations. As January approaches prices for that delivery are higher. The feature of the market is the continued scarcity of nearby metal. December delivery is at least 8.75c., St. Louis, with early January quoted at 8.70c. Metal for delivery during all of January is held at 8.60c. to 8.65c., St. Louis, or 8.95c. to 9c., New York. Future deliveries beyond January are five to ten points lower for each month than the January quotation.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 34c., with shot nickel at 35c. and electrolytic nickel at 38c. per lb.

Antimony.—There is no let up in the scarcity of Chinese metal, which today was quoted at 22.37½c., duty paid, New York, for November-December shipment from China. This metal would ordinarily arrive here in February-March. Quotations on spot metal are entirely nominal at not less than 22.25c. to 22.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 28c. per lb. delivered.

Old Metals.—The market is generally unchanged with business showing the usual holiday dullness. Dealers' selling prices, in cents per lb., are as follows:

Copper, heavy and crucible	13.75
Copper, heavy and wire	13.00
Copper, light and bottoms	11.75
Heavy machine composition	10.00
Brass, heavy	9.00
Brass, light	8.00
No. 1 red brass or composition turnings	9.25
No. 1 yellow rod brass turnings	9.50
Lead, heavy	8.25
Lead, tea	7.00
Zinc	5.75
Cast aluminum	22.00
Sheet aluminum	22.00

Chicago

Dec. 28.—The market is very quiet, copper, tin and antimony being unchanged. Lead and zinc are a trifle more firm. Quotations of used metals are unchanged in a dull market. We quote, in carload lots: Lake copper, 14.25c.; tin, 63.25c.; lead, 9.15c.; zinc, 8.80c.; in less than carload lots, antimony, 24c. On old metals we quote copper wire, crucible shapes and copper clips, 11c.; copper bottoms, 9.25c.; red brass, 9c.; yellow brass, 8c.; lead pipe, 8c.; zinc, 5.25c.; pewter, No. 1, 37c.; tin foil, 44c.; block tin, 52c.; all being dealers' buying prices for less than carload lots.

Non-Ferrous Rolled Products

No change has been made in the quotations on brass and copper rolled products since those of Dec. 16. Zinc and full lead sheets also are unchanged since last week. For New York warehouse prices see page 1854.

List Prices Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight Up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over	
<i>Sheets</i>	
High brass	19 1/4c.
Copper, hot rolled	22 1/2c.
Zinc	12c.
Lead (full sheets)	13c.
<i>Seamless Tubes</i>	
High brass	23 3/4c.
Copper	24 1/2c.
<i>Rods</i>	
High brass	16 7/8c.
Naval brass	19 1/2c.
<i>Wire</i>	
Copper	16 1/4c.
High brass	19 1/2c.
<i>Copper in Rolls</i>	21 1/2c.
<i>Brazed Brass Tubing</i>	27 1/2c.

Another Large Increase in Unfilled Steel Orders

Unfilled orders on the books of the United States Steel Corporation as of Nov. 30 aggregated 4,581,780 tons, an increase of 472,597 tons over those which remained unfilled on Oct. 31. This compares with an increase of 391,886 tons in October and with 204,494 tons in September, the first one since February. There had been decreases from March to the end of August. A year ago the unfilled business was 4,031,969 tons, or 549,811 tons less than for Nov. 30 this year. Following is the unfilled tonnage as reported by months, beginning with January, 1923:

	1925	1924	1923
Jan. 31.....	5,037,323	4,798,429	6,910,776
Feb. 28.....	5,284,771	4,912,961	7,283,989
March 31.....	4,863,564	4,782,807	7,403,332
April 30.....	4,446,568	4,208,447	7,288,509
May 31.....	4,049,800	3,628,059	6,981,351
June 30.....	3,710,453	3,262,505	6,386,261
July 31.....	3,539,467	3,187,072	5,910,763
Aug. 31.....	3,512,803	3,289,577	5,414,663
Sept. 30.....	2,717,297	3,473,780	5,035,750
Oct. 31.....	4,109,183	3,525,270	4,672,825
Nov. 30.....	4,581,780	4,031,969	4,368,584
Dec. 31.....	.....	4,816,676	4,445,339

The high record in unfilled orders was 12,183,083 tons, at the close of April, 1917. The lowest was 2,674,757 tons, on Dec. 31, 1910.

PERSONAL

Frank Purnell, vice-president in charge of sales, has been elected assistant president of the Youngstown Sheet & Tube Co., Youngstown, and Walter E. Watson, general manager of sales, has been named to the position heretofore held by Mr. Purnell. The latter will now share with President James A. Campbell the heavy executive duties of the corporation and in the absence of Mr. Campbell will be its chief executive officer. The change marks the beginning of the gradual relinquishment of his duties as president by Mr. Campbell; he plans to take longer vacations in the future and possibly a trip abroad within the next year. Now in his seventy-second year, Mr. Campbell has directed the destinies of the Sheet & Tube company for a quarter of a century. In 1901 he became vice-president and general manager, and succeeded in 1903 to the presidency, a position he has held since. He personally supervised purchase of the properties of the Brier Hill Steel Co. and the Steel & Tube Co. of America, and the rearrangement and modernization of the various plants involved. By the middle of 1926, the Sheet & Tube company will bring to completion an expansion program involving expenditure of \$20,000,000. Mr. Purnell, whose father, Edward Purnell, was a heater in the Youngstown district mills of the Carnegie Steel Co., started with the Sheet & Tube company 20 years ago as a hallboy, and in the interim has made rapid advances. His experience in the industry has been largely confined to the sales division. During the war he was sent to Washington to assist in the steel division of the War Industries Board. After the war Mr. Purnell became vice-president of the Consolidated Steel Corporation, formed by a number of the larger independents to handle their export trade, with headquarters in New York. This company was subsequently dissolved and Mr. Purnell was elected vice-president of the Bethlehem Steel Corporation, in charge of its export trade. About two years ago, upon the death of W. E. Manning, vice-president of the Sheet & Tube company in charge of sales, Mr. Purnell was recalled to Youngstown, and has since directed the sales policy, working in close cooperation with President Campbell. He is a product of the Campbell organization. Mr. Watson served the Sheet & Tube company as assistant sales manager, and was made general manager of sales at the death of Mr. Manning.

Charles M. Schwab will sail for Europe on Jan. 16.

Theodore W. Kirtland, president Holyoke Belting Co., Holyoke, Mass., recently was tendered a dinner by employees in honor of his sixtieth birthday. Mr. Kirtland has been president of the company since 1905.

E. Allen Moore, chairman of the board of directors, Stanley Works, New Britain, Conn., is confined to his home by illness.

Harry C. Barnes, secretary Wallace Barnes Co., Bristol, Conn., has been made a director of the Bristol National Bank, to succeed the late Edward G. Dunbar.



FRANK PURNELL

Henrik Owensen, chief engineer Youngstown Sheet & Tube Co., returned last week from Germany, where he supervised construction of the new seamless tube mill to be imported and installed by the company at its East Youngstown works. The building of this mill has been completed and shipments will be made early in 1926. Mill buildings are likewise ready for installation of the equipment. The new unit represents an expenditure of \$3,000,000, and will be completed, it is expected, during the middle of the year.

Frederick P. Truesdale will assume on Jan. 1 the management of a newly formed coke and coal sales department of J. W. Dickson & Co., 1806 Commonwealth Building, Pittsburgh. Mr. Truesdale formerly was identified with Hickman, Williams & Co., and the Snowden Coal & Coke Co.

J. Milton Hughes, Sharon, Pa., has been promoted to superintendent of the Lowellville, Ohio, blast furnace of the Sharon Steel Hoop Co., succeeding William C. Holzworth, granted and extended leave of absence to operate for H. W. Grant, receiver, the Struthers furnace of the Struthers Furnace Co. Mr. Hughes has been assistant blast furnace superintendent for the Sharon company, with which he has been associated 21 years, starting as a check boy.

John C. Bannister, vice-president in charge of engineering of the Walworth Co., who decided several months ago to retire from active work on Jan. 1, was given a farewell dinner at the Harvard Club in Boston, Dec. 21. There were present 28 men, including the executive officers of the company and a number of Mr. Bannister's most intimate associates in the Boston offices. The chief feature of interest was the presentation to Mr. Bannister by President Coonley of a handsome book containing letters from friends of Mr. Bannister all over the country. Men who knew him when he was a boy struggling for an education; men who worked with him at Kewanee in the early days when he was employed by the National Tube Co.; men who have known him on the golf course and in the shooting box, and men who have been closely associated with him during the last few years, all contributed their part of the general tribute. F. H. Morehead, chief engineer of the company, takes over Mr. Bannister's responsibilities.

W. J. Henry has been appointed district manager Harnischfeger Corporation, Milwaukee, with headquarters at Charlotte, N. C.

J. I. Byrne, formerly chief engineer for the Texas Carnegie Steel Association, Galveston, has been appointed general manager of the Orange Car & Steel Co., Orange, Tex. George E. Cole will continue his connection with the Orange company as manager of sales.

S. D. Heed has been elected president of the board Hurley Machine Co., Cicero, Ill., Neil C. Hurley, who has been president of the company for 20 years, becomes chairman of the board, while Edward N. Hurley, previously chairman, becomes chairman of the executive committee. Members of the board of directors are, in addition to those serving on the executive committee, Joseph E. Otis, Silas H. Strawn, Alva J. Fisher, N. R. Birge and S. D. Heed. The new president has been vice-president and general manager of the Union Gas & Electric Co., Cincinnati, for the past five years. He is also vice-president of the Columbia Engineering & Management Co., New York.

H. C. Curtiss, district sales manager for the B. F. Sturtevant Co., has been transferred from Indianapolis to St. Louis.

Richard W. Saunders has left Meriden, Conn., and is now located in Toronto, Ont., where he is Canadian manager for the C. J. Tagliabue Mfg. Co.

D. L. Bellinger has been elected president of the Mount Morris Valve Corporation, and is now located in Mount Morris, N. Y.

Philip V. Tippet has been promoted to the position of assistant chief engineer of the Farrel Foundry & Machine Co., Ansonia, Conn.

W. W. Sayers, formerly chief engineer of the Philadelphia plant, Link-Belt Co., has been appointed chief engineer of the company. This new position carries with it the responsibility of general supervision over all engineering work, harmonizing the practice of the several plants and following up new engineering developments. His headquarters will be at the general office, 910 South Michigan Avenue, Chicago. Mr. Sayers was graduated from the University of Illinois in 1897 and, in his 23 years of Link-Belt experience, has held important positions in the engineering, construction and sales departments of the company.

George L. Morehead, for the past six years attached to the management of the several Indianapolis plants, Link-Belt Co., as well as at the Chicago plant, has become manager of the Philadelphia plant. He was graduated from the University of Missouri in 1902 and has been with Link-Belt Co. for the past 19 years. In these active years he has successively held the positions of maintenance engineer, superintendent of con-

struction and assistant chief engineer of the Chicago plant; assistant manager of the Indianapolis organization, and then manager of the Ewart Works and Belmont Works, both located in Indianapolis.

F. M. O'Laughlin has been appointed by the Climax Engineering Co., Clinton, Iowa, as sales representative for the Eastern sales territory, with headquarters at the company's offices, 30 East Forty-second Street, New York. Mr. O'Laughlin was formerly assistant manager of the New York office, Buffalo Gasoline Motor Co., Buffalo. He has had wide experience in the sale of engines.

George A. Colley, who has previously represented the Climax Engineering Co., has associated himself with the A. G. Griese Co., 331 Madison Avenue, New York.

Julean Arnold, United States commercial attaché in China, has arrived in this country and will be at the office of the Bureau of Foreign and Domestic Commerce, Washington, until about Jan. 19. Mr. Arnold is interested in the display of American industrial films that will show the Chinese how American products are made and give them a clearer idea of industrial conditions in this country. These films must be of educational value rather than merely of an advertising character.

HOWARD R. WILSON, treasurer and director Ames Shovel & Tool Co., 90 Ames Building, Boston, died on Dec. 15.

HARRY HENRY, assistant purchasing agent Southern Pacific Co., San Francisco, died at his home in that city Dec. 21 of pneumonia. Mr. Henry entered the service of the Southern Pacific Co. as a clerk in 1895. In 1913 he was appointed as an assistant to the director of purchases, with headquarters in New York. Last June he returned to San Francisco when the purchasing department of the company was moved to the San Francisco office. He was born at Fort Scott, Kan., Dec. 12, 1879.

EDWIN GRAY RUST, 56, district mechanical engineer for the Youngstown Sheet & Tube Co. in the Youngstown district, died Dec. 25 from pneumonia at his home in Youngstown. Inventor of the Rust boiler, he was prominently known in steel and construction engineering circles throughout the country. During the war, he served as a member of the United States Shipping Board. For many years Mr. Rust practiced his profession in Pittsburgh, and had been connected with the Youngstown company only three months. The body was taken to the place of his birth, Leesburg, Va., for interment.

JOHN A. POTTER, who was superintendent of the Homestead Steel Works at the time of the famous strike of 1892, died recently at his home in Los Angeles, Cal., where he had resided for several years. He was born in Mt. Savage, Md., June 8, 1859, and was identified with the Carnegie Steel Co. from 1873 to 1893. He started in as a greaser boy at the Lower Union Mills at Pittsburgh and subsequently filled the positions of machinist and foreman machinist, Edgar Thomson Works, master mechanic, assistant superintendent and general superintendent, Homestead Works, and finally was chief mechanical engineer of all the Carnegie plants. For a brief period before becoming general superintendent of the Homestead Works he was identified with the Illinois Steel Co. at South Chicago. He retired from the active steel business in 1893 and since had been engaged in scientific metallurgical researches, with headquarters in Los Angeles.

CLARENCE F. LONG, first vice-president and a director, Dover Stamping & Mfg. Co., Cambridge, Mass., died at his home in Brookline on Dec. 23, following an illness of four months. Mr. Long was born in Rochester, N. Y., 54 years ago. In the early part of his business career he was superintendent Reed Mfg. Co., Newark, N. J.

OBITUARY

HENRY M. NORRIS, secretary Cincinnati Bickford Tool Co., died at his home on Dec. 24, following an attack of heart disease. Born in Trenton, N. J., in 1868, he was graduated from Cornell University in 1891. After serving an apprenticeship with Beament, Miles & Co., Philadelphia, he became a designer of machine tools and was associated at different times with the Ferracute Machine Co., Brown & Sharpe Mfg. Co. and the Pond Machine Tool Co. In 1893 he became superintendent of the Appleton Mfg. Co., Philadelphia, but a year later took a similar position with the Riehle Brothers Testing Machine Co. and also served as general manager of the Campbell & Zell Co., Baltimore. He went to Cincinnati in 1897 as engineer and works manager of the Bickford plant and held that position until 1909, when he became secretary and a director of the company, in which capacity he served until his death. Mr. Norris not only lectured and wrote about machinery, but also achieved distinction as an inventor. He invented the first speed box used on a machine tool, designed the first high-speed, high-power radial drill and worked out the device for obtaining the current formula given in engineers' handbooks for ascertaining the power required to drive drills in metals at various speeds. During the war he was a member of the War Industries Board, the Council of National Defense and the Ordnance Department at large. He was one of eight efficiency engineers selected for service in the Ordnance Department at the Watertown Arsenal during the war. A pioneer member of the National Metal Trades Association, Mr. Norris was also charter member of the Army Ordnance Association and a member of the American Society of Mechanical Engineers.



H. M. NORRIS

Trade Changes

Next month control of the William L. Gilbert Clock Co., Winsted, Conn., a \$300,000 corporation employing about 450, will pass to Norman F. Thompson, Jr., Rockford, Ill. No change in the management and organization will be made at present.

The Economic Machinery Co., Worcester, Mass., builder of bottle labeling machinery, has been reorganized with Arthur F. Blanchard of the Blanchard Rubber Co., Boston, as president, and Eugene A. Sisson, recently with the Mills Belt Co., Worcester, as treasurer. Leonard W. Howell and Arvid T. Ekwall, the new vice-presidents, have been active for years in the conduct of the business.

The Link-Belt Co., Chicago, has opened a branch office in the First Wisconsin National Bank Building, Milwaukee, with R. C. Kendall in charge. This step has been taken as a result of the constantly-growing volume of orders for silent chain drives for the transmission of power.

Theodore Greissmann & Co., 624 South Michigan Boulevard, Chicago, have been appointed district sales agents for the Delaware Seamless Tube Co., Auburn, Pa.

The Globe Steel Tubes Co. is moving its Chicago office from room 1039, Peoples Gas Building, to rooms 516 and 517, Wrigley Building, 400 North Michigan Avenue.

The Union Hardware Co., Torrington, Conn., skates and steel fishing rods, exercising an option, has acquired stock control of Chapin-Stephens Co., Pine Meadow, Conn., levels, rules and planes, possession to result Jan. 1.

The Truscon Steel Co. has leased a suite of offices on the eighth floor, Capitol Building, 250-272 Tremont Street, Boston.

Financial Notes

The Mystic Iron Works, a subsidiary of the Massachusetts Gas Companies, Boston, has notified the Massachusetts Commissioner of Corporations that its capital stock is to be increased from 30,000 shares, par \$100, to 40,000 shares of common stock. The new 10,000 shares are to be sold for cash at par at the company's discretion.

The Massachusetts Gas Companies, Boston, which control the Mystic Iron Works, New England Coal & Coke Co., and other properties, have sold to bankers, who in turn are offering for public subscription, \$18,000,000 20-year 5½ per cent sinking fund bonds, due Jan. 1, 1946, at 98½, to yield about 5% per cent on the investment. Proceeds derived from the sale of these bonds will be used to retire \$5,000,000 coupon 5 per cent three-year notes due April 15, 1927, and for the purchase of the capital stock of certain companies, which will give the Massachusetts Gas Companies a modern coal handling terminal at Providence, R. I., an additional coal handling terminal at Boston and coal properties in the New River, W. Va., district. In connection with the bond offering, it is announced that the Mystic Iron Works will begin operations some time during the first half of 1926.

Plans of New Companies

The Carlson Mfg. Co., East Hartford, Conn., has been organized to make tools such as pliers, including Carlson "super-pliers," with several other styles, wrenches and other tools. At present these will be made by contract.

The Wilkes Silver Plate Co., Inc., Rochester, N. Y., has been organized to carry on the manufacture of silver plated holloware. Capital stock of \$25,000 has been taken up solely by the men engaged in production. The company has taken over the line of holloware formerly made by the Van Bergh Silver Plate Co. and is adding many new items, closely following the Sterling patterns. It will maintain and operate a large plating and refinishing plant.

Eccles & Davies, engineers, 320 South San Pedro Street, Los Angeles, have been incorporated as the Eccles & Davies Machinery Co. and will deal in machine tools, railroad supplies, punches, dies and special steels. Chris Eccles is president of the new corporation; George A. Davies, vice-president and treasurer, has had a broad experience, having been for 20 years past with Wickes Brothers, Saginaw, Mich. H. R. Hickman, secretary, was for years with the Eccles & Smith Co. as office manager.

The New Haven Electric Switch Co., North Haven, Conn., has been organized with capital stock of \$50,000, to manufacture knife switches and electrical specialties, fuse blocks, combination switches and plug cutouts. The company is tooled to produce electrical switching devices and electrical products of kindred nature and screw machine and pressed metal products.

The Laidlaw Automatic Window Lock Co., Peoria, Ill., has been incorporated to manufacture automatic window locks and appliances. Frank Laidlaw is president and treasurer, Casper Salm is vice-president, and Edward E. Anderson is secretary.

Eshenower & Hatmaker Machine Tool Works, Inc., 520-522 South Cameron Street, Harrisburg, Pa., has been incorporated for \$25,000 to machine manganese cast and forged steel, and for treating and selling tools for this kind of work. These tools are also extremely valuable to all other kinds of machining work, for carbon and alloy steels. The business has been conducted under a partnership known as Eshenower & Hatmaker. The company is going to put its tools on the market but is not ready to ship tools until after the middle of January. D. E. Mellinger is manager of sales.

Arnold's Iron & Steel Mills, Inc., 511 East Seventh Street, Oklahoma City, Okla., has been organized with a capital of \$37,500 to manufacture iron, steel and other metal products. The company will operate a 10-in. merchant mill, using scrap iron entirely. Oil will be used for fuel, manufacturing reinforcing bars from rails and billets, and merchant iron from scraps. The mill is installed and about ready to operate. The company expects to use a large part of the product in nuts, bolts, washers and mining car supplies. James W. Arnold is president and general manager.

The Clark Mfg. Co., 3915 Powelton Avenue, Philadelphia, has been organized with capital of \$25,000. Manufacturing will be done entirely by contract. William Bernard Clark is president.

J. H. McEvoy & Co., 600 Milby Street, Houston, Tex., has been organized with a capital of \$200,000 to manufacture and deal in oil-well equipment, including McEvoy wireless well strainers and fittings.

The Birmingham Fabricating Co. has been organized and incorporation papers taken out, the purpose of the company being to manufacture ornamental steel and iron designs, stairways, signs, fire-escapes and other fabricated shapes. J. M. Plant is president, L. H. White, vice-president and C. F. Byrne, secretary-treasurer.

Industrial News Notes

The Johnson & Jennings Co. is building a foundry at 104 Solvay Street, Detroit, to manufacture sash weights, stars and cast iron washers. This company operates two such foundries in Chicago and one in Cleveland. The new Detroit unit will have a capacity of 20 tons per day and will melt waste materials only.

The Ray Sheet Metal Works, Wichita Falls, Texas, has been incorporated with capital stock of \$80,000. Location is on a site of 16 acres, the buildings are now under construction, additional necessary machinery purchased, and the company expects to be in full production by the middle of January. Riveted and welded tanks, flumes and gates, smokestacks, etc., are among the products. Nat. L. Inge is vice-president and sales manager. F. A. Ray is manager and owner. The old plant at 300 Oak Street will continue in operation. It was established in 1922.

The Frank Mossberg Company has been reorganized with new working capital, new officers and directors, under the name of Frank Mossberg Corporation. The financial statement after reorganization shows current assets approximately \$220,000 in excess of current liabilities. For more than 20 years this company has been manufacturing wrenches and socket sets for the automotive industry, pressed steel beam heads, section and adjustable heads for the textile industry and steel spools and reels for the wire and cable industry. In addition to these lines, the company also does special steel stamping of all descriptions. Lewis R. Smith is president and general manager of the reorganized company and A. A. Underwood, one of the pioneers in introducing pressed steel beam heads in the textile mills, is secretary and treasurer.

The Binghamton Scale Mfg. Co., successor to Jones of Binghamton and Osgood Scales, Binghamton, N. Y., is expanding through reorganization as a corporation to be capitalized at \$500,000. The product will be the Jones of Binghamton scales and weighing machines, the Osgood scales and weighing machines, the registered trade names and patent rights, together with the patterns and all things belonging to these two scale companies, having been taken over by the Binghamton Scale Mfg. Co., and registered under this trade name two years ago. The company is looking for a new factory site in Binghamton, as the present site is too small.

Nathan Klein & Co., 208 Center Street, New York, are liquidating their stock of machinery, consisting of motors, generators, air compressors, turbines, motor-generator sets, gasoline-engine generator sets, controllers, circuit breakers, grinding machines, drilling machines, pumps, overhead traveling cranes, electric hoists and other miscellaneous equipment. The stock will be disposed of at auction on Jan. 13, 14 and 15, at 10 a. m. on each day. The company will soon open a large electrical repair shop.

Chromium Nickel Electric Ingots

(Continued from page 1801)

was left quiet without any addition
 2.32 Current off
 2.36 Tapped (no Al added)

Pouring of the heat:

- 2.41 Ladle "ready to pour"
- 2.44 Pouring started
- 2.50 Steel in the top of the 5-ton mold
- 2.51 Sample No. 8 taken
- 2.54 Mold filled up; remaining steel poured in old mold
- 2.55 Slag out of ladle

Analyses of steel samples:

Sample No.	1	2	3	4	5	6	7	8
Per Cent C	0.04	0.30	0.42	0.44	0.44	0.45	0.44	0.43
Per Cent Mn	0.12	0.46	0.48	0.47	0.49	0.49	0.54	0.53
Per Cent Si	0.01	0.22	0.14	0.16	0.15	0.15	0.21	0.18
Per Cent P	0.004	0.008	0.010	0.009	0.011	0.010	0.012	0.012
Per Cent S	0.036	0.019	0.014	0.011	0.009	0.010	0.008	0.008
Per Cent Ni	2.61	2.58	2.58	2.56	2.57	2.52	2.58	2.55
Per Cent Cr	0.13	0.15	0.22	0.17	0.19	0.24	1.08	1.09

Finishings:

Carburite	140 lb.
Ferrosilicon	60 lb.
Ferrosilicomanganese	47 lb.
Ferrochromium	172 lb.

Slags:

Lime	oxid. slag	239 lb.
	red. slag	215 lb.

Fluorspar	furnace	15 lb.
	ladle	5 lb.

Ferrosilicon, powdered	about 40 lb.
Coke, powdered	about 15 lb.

Analyses of slag samples:

Sample No.	1	2	3	4	5	6	7
Appearance	Dark brown	Light gray, brown	gray to white	Same as No. 3	Almost white,		
SiO ₂	15.87	12.78	17.02	17.95	18.44	20.26	24.51
FeO	34.69	1.88	1.56	1.13	1.27	0.93	0.55
MnO	8.94	0.97	0.80	0.73	0.81	0.58	0.42
CaO	28.31	61.47	63.61	59.87	57.31	58.00	59.73

Composition of the additions:

	C	Mn	Si	Cr	Fe
Ferrosilicon	0.13		47.82		
Ferrosilico-					
manganese	0.24	24.32	20.47		
Ferrochromium	0.61			64.62	
Carburite	approx.			approx.	
Coke	86.12			48%	2% tar 10.81% ash 0.58% S
Lime	SiO ₂	CaO	CaCO ₃	CaF ₂	
Fluorspar	0.10	94.12	5.25	80.78	

Power consumption:

Current on	8.20
Tapped at	2.35
Total time	6 hr. 15 min.
Total kwhr.	3,900
Total weight of metal charged..	12,408 lb.
Kwhr. per ton of metal charged..	629

For distribution of heat supplied by the current, see Fig. 1.

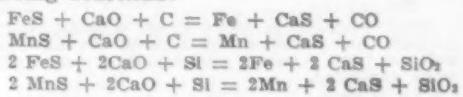
The Slags

It is a well known fact that in the correct metallurgical operation of a basic-lined electric furnace there are the oxidizing as well as the reducing slags as the best indicators. While the exact constitution of these slags is not yet thoroughly understood and analyses often vary over wide limits, a good slag will always possess certain outstanding characteristics.

Oxidizing slags may be considered to consist of a portion of phosphates and silicates, the former being held in solution by the silicates. Moreover, the acid and basic constituents must be so proportioned by the charging scale, ore, lime, or quartz sand as to permit the slag to hold phosphorus especially as completely as possible. After the charge is melted, this slag is removed, partly by tilting the furnace. Up to 0.040 per cent P in metallic charge one slag is made; up to 0.060 per cent in charge the slag is made and removed twice.

After "slagging" a new reducing slag is formed by the addition of lime, fluorspar or quartz sand, powdered ferrosilicon and coke dust. During this period, oxides (MnO, FeO, etc.) are reduced to the corresponding metals by means of carbon of coke dust or by means of silicon of ferrosilicon previously added to the slag. For the removal of sulphur the slag must be made very

basic and, for this purpose, enough lime must be added to combine with the constituents which are formed by the occurring reactions:



During this reducing period, all samples of the slag should be as light as possible and particularly toward the end of the heat should crumble to a snow-white powder when cooling. As a rule the bath is kept quiet for the last 25 to 40 min. and no more additions are made; only a few small portions of powdered coke, or better ferrosilicon and lime, are added in order to prevent the reduction of sulphur from the slag to the bath.

Thermal Efficiency of a Basic Lined Héroult Furnace on Nickel-Chromium Steel

Comparative heat balance sheets are worked out most conveniently on a uniform basis, i.e., per ton of metallic charge. Taking the heat previously described into consideration the following balance sheet was obtained:

Measurements and data used for the calculations:

Periods of the heat:	
Melting	4 hr. 15 min.
Deoxidizing	20 min.
Reducing	1 hr. 30 min.
1. Charge	
Weight of metal during melting	12,130 lb.
Weight of metal during deoxidation	12,195 lb.
Weight of metal during reduction	12,400 lb.
Heat in 1 kg. charge	370 calories
2. Slags	
Weight of oxidizing slag	860 lb.
Weight of steel in slag	80 lb.
Weight of reducing slag	430 lb.
3. Cooling water on the roof rings	7,930 lb.
Quantity of water used per hour	7,930 lb.
4. Cooling water on the transformer	
Quantity of water used per hour	7,930 lb.

The cooling water from the transformer was also used for the cooling of the roof rings; thus the quantity of the circulation water was the same as for the rings.

Results of the calculations:

1. Heat in one ton of metal	
Melting	302,700 calories
Deoxidation and reduction	33,800 calories

Total	336,500 calories
2. Slags	
Heat in 860 lb. oxidizing slag	199,000 calories
Heat in oxidizing slag per ton metal	32,700 calories
Heat in 430 lb. reducing slag	80,300 calories
Heat in reducing slag per ton metal	13,000 calories

3. Cooling of the roof rings		
Temp. Diff. Deg. C.	Calories per Ton Metal	
Melting	4.4	67,300
Deoxidation	5.7	6,800
Reduction	6.8	26,700

Total	110,800	18,100
4. Cooling of the transformer		

Temp. Diff. Deg. C.	Calories per Ton Metal	
Melting	1.8	27,600
Deoxidation	2.1	2,500
Reduction	2.8	15,100

Total	45,200	7,400
Kwhr. and corresponding heat supplied by current:		

Period	Length of Period	Kwhr. Total	Kwhr. per Ton	Calories per Ton	Per Cent
Melting	4 hr. 15 min.	2,728	440.0	378,200	69.8
Deoxidization	20 min.	212	34.3	29,400	5.4
Reduction	1 hr. 30 min.	965	155.7	184,000	24.5

Total	Actual length of heat	3,900	629.0	541,600	100
Melting	6 hr. 5 min.				

Heat supplied	Calories
440 kwhr	378,200
Oxidation of elements	74,500
Heat utilized	
Heating charge from 20 to 1550 deg. C	302,700
Heat in slag	32,700
Cooling rings	11,000
Transformer	4,550

Deoxidation	
Heat supplied	29,400
34.3 kwhr	
Heat utilized	
Cooling rings	1,100
Transformer	400

Reduction	
Heat supplied	
155.7 kwhr	134,000
Oxidation of elements during deoxidation	32,000

Heat utilized	
Heating charge from 1550 to 1730 deg. C.	33,800
Heat in slag	13,000
Cooling rings	5,900
Transformer	2,450
The calories in the "cold" charge, the heat produced by powdered ferrosilicon or coke dust as well as heat required for expelling moisture, etc., were neglected.	
Total heat balance	
Heat supplied	
629.0 kwhr.	541,600
Oxidation of elements	106,500
Heat utilized	
Heating, melting and overheating charge	336,500
Heat in slag	45,000
Cooling rings	18,100
Transformer	7,400
Radiation, etc.	241,100

Thus the heat distribution per 1 ton of nickel chromium steel is:

	Per Cent
Steel	336,500 calories = 51.9
Slag	45,000 calories = 7.0
Cooling rings	18,100 calories = 2.8
Transformer	7,400 calories = 1.1
Radiation, etc.	241,100 calories = 37.2

648,100 calories = 100.0 (Fig. 2)

Essentials to Soundness of Nickel-Chromium Steel

In addition to the fundamental requirements by which the steel has to be thoroughly prepared by well developed methods and with special care, the conditions under which the molten metal solidifies in the mold is probably the next important factor in the production of sound nickel chromium steel ingots. Therefore a design of mold has to be adopted which has inside dimensions larger at the top than at the bottom in order to prevent the output of sound metal from lowering, due to piping or blowholes. As an average of the author's observations the following proportions are recommended:

1. The length of Ingots weighing 500 to 10,000 lb. (the "hot top" is not taken in consideration) should be about 3 to 5 times the maximum width of the cross section.

2. The upper width of the ingot should be approximately 15 to 20 per cent larger than the lower one.

3. To prevent the formation of cleavage planes or lines of weakness, as a result of projecting dendrites in the corners of solidifying ingots, the recent square cross section of ingots is slowly abandoned. Thus the polygonal (hexagonal or octagonal) and differential corner ingots are coming prominently into use. Only when a large number of very small ingots (40 to 100 lb.) are to be produced, the round or better rectangular cross section may be adopted, the latter having very round corners, in order to prevent the mentioned imperfections of the cast ingots.

The pouring temperatures: The pouring temperatures are ordinarily only about 100 to 250 deg. C. above the natural melting point of the steel poured; for very small ingots, however, the steel is tapped 250 to 350 deg. C. above its melting point. Tests for temperature are taken by pouring a sample slowly from the test spoon into a little mold of about 3 or 5 lb. capacity and observing the phenomena as it leaves the spoon. It is also useful to note the length of time it takes for a spoonful of finished metal to skin; the time, depending upon the size of ingots to be poured, should be from 20 to 70 sec. and indicates very accurately the degree of overheating the steel.

After the steel is thoroughly deoxidized and as free as possible from gases and inclosures, of proper pouring temperature in addition to the correct chemical composition, the heat is ready for tapping, which is conducted in the usual way. Special care must be taken not to mix slag and steel again, i.e., to tap the steel from underneath the slag.

Segregation and size of ingots: Electric nickel-chromium steel is usually poured into ingots of small size and hence radial or axial segregation of P, S and C is practically negligible; although, if the ingots are larger (normally not over 5 tons) and segregation took place, the quantity of the elements lowering the steel quality is so low that in the segregated center or upper portions of the ingot they could scarcely reach to a dangerous amount.

Engineering Foundation Adopts Platform

Policies and plans for future activity were drawn up by the Engineering Foundation at a meeting of its board held in New York Dec. 10. These policies, announced as a "platform for Engineering Foundation" were adopted by the board after approval of a draft by the governing body of each founder society (mechanical, electrical, civil and mining engineering societies) based on a unanimous recommendation of their joint conference committee.

Among other declarations, it is stated that the Engineering Foundation regards engineering research as the preferred field for its activities. It will select or approve specific researches which it will assist by appropriation of funds or otherwise and will select for each project the agency, collective or individual which seems most effective. It will assume no direct responsibility for the prosecution of any specific research.

The foundation will cooperate with the national engineering societies and preferably support researches approved by it and sponsored by one or more of them. A member of the foundation or its staff may be an advisory but not an active member of any committee or other organization in immediate charge of a research assisted financially by the foundation. The right is reserved to require progress reports from committees or individuals assisted. The foundation will cooperate with the founder or other national engineering societies in raising funds for approved research, and will cooperate in securing information of the state of the art for use of committees of the societies.

It is felt that the adoption of the plan, given in part above, has placed the impartial and judicial attitude of the Engineering Foundation beyond the questions, which, without it, inevitably would have arisen when the foundation in the future determined the allotment and use of large sums of money.

Merger of Typewriter Makers

Two large typewriter companies—Corona and L. C. Smith—have announced their merger. Both are located in Central New York and their machines are non-competitive, the L. C. Smith being a standard office typewriter and the Corona a portable. The L. C. Smith & Brothers Typewriter Co. was founded in Syracuse in 1903. The Corona Typewriter Co. was established six years later, with principal plant at Groton, N. Y., and a branch factory at Cortland.

This merger, which involves \$12,000,000 of capital, was negotiated by Ford, Bacon & Davis, New York, which in 1924 purchased control of the L. C. Smith company. Together the two manufacturers employ over 3000 people and have offices in all the larger cities of the country. In addition, the Corona company has over 2000 sales agencies in the United States. Each company has a complete foreign distributing organization, reaching every country on the globe; in many cases the same distributor already handle both machines.

According to Frank R. Ford, who will be executive head of the new organization, all factories of the company will be operated as heretofore. Since they are now taxed nearly to their limit of capacity, and with the anticipated increase in sales, expansion rather than contraction of manufacturing is looked for.

Polish engineering students who seek training in the industries and universities of this country will be aided by the American Engineering Council, the administrative board of which has sanctioned a working arrangement with the Council of the Institute for Scientific Management of Poland. The institute must certify to the fitness of each student, for whom a complete schedule of study, including the designation of a sponsor in this country must be worked out in advance.

Machinery Markets and News of the Works

PROSPECTS PROMISING

Machine Tool Outlook at Beginning of New Year Regarded Hopefully

Indications Point to Fairly Heavy Buying of Shop Equipment During the First Half of 1926

ALTHOUGH December business in machine tools showed a falling off as compared with November, the outlook for 1926 is very promising, according to machine tool builders and their sales representatives. The volume of sales in December was generally larger than in the same month a year ago. There is a substantial

volume of inquiry and much of it is known to be representative of actual buying intention and not merely for purposes of inventory. A Cincinnati machine tool builder estimates that his sales of tools in 1926 may run 10 per cent ahead of 1925 business.

Sustained high production of automobiles, greater activity among the railroads in the purchases of cars, locomotives and shop equipment, and the general prosperity of the country are pointed to as underlying factors which will bring an increased amount of tool buying during at least the first part of 1926.

Deliveries of tools are being extended, principally because of the shortage of skilled mechanics, there being ample shop facilities, but not enough trained workmen. A slight tendency toward advancing wages of skilled mechanics is reported in some sections.

New York

NEW YORK, Dec. 29.

MACHINE tool business through the holiday week was much better than expected. In fact, some sellers report that the volume of orders received the last two weeks of the month will perhaps exceed those of the first half. Inquiries have increased and prospects for a fairly good January business appear quite promising. The Phoenix Utility Co., 65 Broadway, has purchased a small list of tools for the Florida Light & Power Co. The General Electric Co.'s lamp works at Harrison, N. J., bought an 8-in. rotary surface grinder. William Rose & Brothers, Sharon Hill, Pa., bought a 6-in. vertical shaper.

The American Sugar Refining Co., 117 Wall Street, New York, will build a new power plant in connection with its proposed refinery on South Second to South Fourth Streets, Brooklyn. The work will also include a six-story washer plant and a warehouse and distributing building. The entire project will cost in excess of \$2,000,000 with machinery. Earl D. Babst is chairman of the board.

The New York Central Railroad Co., W. C. Bower, manager of purchases and stores, room 344, 466 Lexington Avenue, New York, is asking bids until Jan. 5 for steel car wheels, serial contract 37-1925. W. B. Pollock, manager of the marine department of the railroad, 6 Beaver Street, is asking bids to close at the same time for the construction of six steel covered barges, serial contract 38-1925.

The Long Island Railroad Co., Pennsylvania Terminal, New York, is arranging for the electrification of its Bay Ridge division, including the Bay Ridge shops and terminal yards next year, estimated to cost \$4,040,000. It is proposed also to electrify the Montauk division from Long Island City to the Holban yards, including the four yards and terminals at Long Island City, Blissville, Fresh Pond and Holban, estimated to cost \$6,010,000. George Le Bouillier is vice-president.

The Gold Seal Laundry, 962 Franklin Avenue, Brooklyn, will build a steam power house in connection with its proposed mechanical laundry plant on Atlantic Avenue, Brooklyn. A service, repair and garage building for company cars will also be erected. The entire project will cost \$165,000. Shampman & Shampman, 168 Montague Street, are architects.

The Chevrolet Motor Co., Broadway and Fifty-seventh Street, New York, with headquarters, at Flint, Mich., is tak-

ing bids for a two-story service and repair factory branch on Fifty-sixth Street, near Eleventh Avenue, 100 x 200 ft., to cost close to \$100,000. Albert Kahn, Marquette Building, Detroit, is architect.

The J. G. White Management Corporation, 33 Liberty Street, New York, has taken over the management and supervision of the Coldak Electric Refrigerator, Inc., and will arrange for extensive production. A financing plan is being determined to provide funds for this purpose, as well as for distributing and other expansion.

The plant and equipment of the Astoria Mahogany Co., Astoria, L. I., bankrupt, has been acquired by John F. Young and associates for \$2,000,000. The acquisition also includes the branch mills at Chicago, Grand Rapids, Mich., and Jamestown, N. Y. It is understood that the new owners plan to reorganize the company, improve the plants and resume operations in the near future.

George Ringler & Co., 203 East Ninety-second Street, New York, are considering plans for a six-story automobile service, repair and garage building, 100 x 100 ft. on East Ninety-first Street, to cost \$200,000 with equipment.

The Board of Directors, County Vocational Schools, Perth Amboy, N. J., is completing plans for the construction of a new vocational school for boys to be known as School No. 2, estimated to cost \$270,000. Douglas Fisher, Sayre & Fisher Brick Co., Sayreville, N. J., is a member of the board in active charge.

Clinton B. Cook, Trust Co. Building, Asbury Park, N. J., architect, has plans under way for a three-story automobile service, repair and garage building, 100 x 150 ft., on local site, to cost \$170,000.

The Baltz-Howell Co., 281 Berkley Avenue, Newark, manufacturer of millwork products, has awarded a general contract to William C. Bennett, 93 Lexington Avenue, Bloomfield, N. J., for a one-story addition, 50 x 100 ft., to cost \$20,000. Marshall N. Shoemaker, 15 Central Avenue, Newark, is architect.

The Bonnell Motor Co., 562 Broad Street, Newark, local representative for the Dodge automobile, is asking bids on a general contract for a two-story service, repair and garage building, 200 x 220 ft., at 225 Warren Street, to cost \$300,000. Monks & Johnson, 99 Chauncey Street, Boston, are architects. Horace Bonnell is president.

The Brady Brass Co., Fourteenth and Henderson Streets, Jersey City, N. J., manufacturer of brass and bronze castings, etc., has awarded a general contract to Joseph Jewkes & Son, 676 Montgomery Street, for a two-story addition, 25 x 76 ft., to cost \$55,000 with equipment. John T. Rowland, 101 Sip Avenue, is architect.

Chicago

CHICAGO, Dec. 28.

MACHINE tool dealers find that orders placed so far in December are in excess of those for the corresponding period of 1924. A substantial volume of business is said to be in the making and inquiries now before the trade are more active than at this time last year. The past few days plainly reflect the inventory and holiday period in that actual placement of tools was very light. No changes in prices are recorded for the week and deliveries, if anything, are slightly better. The Santa Fe bought a 42-in. heavy duty planer and a locomotive air pump cylinder grinder. The Illinois Central list which, it is said, will total several hundred thousand dollars, has not been given to the trade.

The A. O. Smith Corporation, Milwaukee, has purchased four Pratt & Whitney die sinking machines and the St. Louis-San Francisco bought a 48-in. carwheel boring machine. The Maytag Corporation, Newton, Iowa, has placed orders for a blower, a cupola and ladles for a new foundry, with the Whiting Corporation.

The Kalman Steel Co., 410 North Michigan Avenue, Chicago, manufacturer of bars for concrete reinforcement, etc., has awarded a general contract to L. Balkin, 1850 West Austin Avenue, for a one-story and basement addition, 50 x 68 ft., to cost \$35,000 with equipment.

The International Motor Truck Corporation, 2234 University Avenue, St. Paul, Minn., will begin work in the spring on its proposed assembling plant at University Avenue and Cromwell Street, to cost \$500,000 with machinery. Headquarters are at 25 Broadway, New York.

The Minnesota Power & Light Co., Duluth, Minn., is disposing of a bond issue of \$3,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. D. F. McGee is vice-president.

Ovens, power equipment, conveying and other machinery will be installed in the three-story and basement plant, 50 x 145 ft., to be erected by the Purity Baking Co., 118 East First Street, Duluth, Minn., to cost \$180,000. W. H. Gast is general manager.

The King Crown Plaster Co., First Avenue and First Street, Cedar Rapids, Iowa, plans the construction of a one-story addition to be equipped as a screening plant. It will cost close to \$20,000 with equipment. J. W. Pichner is vice-president.

The Illinois Northern Utilities Co., Dixon, Ill., is disposing of a bond issue of \$2,500,000, a portion of the fund to be used for extensions and improvements in power plants and system. The company is operated by the Middle West Utilities Co., 72 West Adams Street, Chicago. Martin J. Insull is president.

The Zollner Machine Works, 1720 West Superior Street, Duluth, Minn., has awarded a general contract to George H. Lounsberry, 322 West Superior Street, for a one-story and basement machine shop addition, 50 x 60 ft.

Pittsburgh

PITTSBURGH, Dec. 28.

THE past week has been one of the quietest of the year in the machine tool trade. Considerable business is pending and after the inventory period it is expected that many orders will be placed.

Contract has been awarded by the Chicago Bridge & Iron Works, Old Colony Building, Chicago, manufacturer of steel tanks, standpipes, etc., to the McClintic-Marshall Co., Pittsburgh, for an addition to its branch plant at Greensburg, Pa., to cost \$150,000 with equipment.

F. D. Saupp, Inc., 5929 Penn Avenue, Pittsburgh, has awarded a general contract to Conley & DeMey Co., 127 North Highland Avenue, for a two-story automobile service, repair and garage building, 106 x 150 ft., to cost \$250,000 with equipment. Eric F. Wood, Hardy-Hays Building, is architect.

August Karlson of the Crescent Furniture Co., Warren, Pa., and associates are organizing a company to erect a furniture factory near the city line, to be two stories, 80 x 300 ft., with a one-story wing, 80 x 220 ft., reported to cost \$100,000 with machinery.

The Davis Colliery Co., Glenville, W. Va., will proceed with the construction of a new tipple at its local Glenville mines, to cost \$60,000 with machinery. It will also make enlargements in its boiler plant and install other machinery.

Headquarters are at Elkins, W. Va., John T. Davis, president.

The Board of Education, South Greensburg, Pa., is considering the installation of manual training equipment in its two-story and basement senior and junior high school, to cost \$100,000, for which bids have been asked on a general contract. C. C. Compton, Fourth and Thompson Streets, Donora, Pa., is architect.

The Wheeling Machine Products Co., 1920 Main Street, Wheeling, W. Va., manufacturer of pipe couplings, etc., plans an addition to cost about \$30,000, to be equipped primarily as a forge shop. E. W. Krause is general manager.

The Weston Glass Co., Weston, W. Va., is said to have tentative plans under consideration for new branch works at Huntington, W. Va., to cost \$50,000 with machinery. Louis Wehring is general manager.

The Board of Education, Martinsburg, W. Va., plans the installation of manual training equipment in its proposed new high school, to cost \$300,000, for which bids will soon be asked on a general contract. Frampton & Bowers, 412-14 Eleventh Street, Huntington, W. Va., are architects.

Cincinnati

CINCINNATI, Dec. 28.

MACHINE tool sales have decreased considerably the past week, but builders attribute the slump solely to the holiday season and to the desire of prospective buyers to delay further purchases until after the first of the year. While the volume of business in December fell short of that in November, manufacturers state that sales this month exceeded those of December 1924 by a comfortable margin. The fact that local builders are sustaining their production of machines at a high point gives an optimistic tone to the market.

Indications point to heavy buying of machine tools the first half of 1926. One of the larger local builders predicts that his volume of business the coming year will show an increase of 10 per cent compared with this year. More activity in railroad circles gives hope that carriers will purchase equipment in liberal quantities in the next six months. Although most of the automobile makers are contracting for only a few machines at present, renewal of buying on an extensive scale is anticipated in January or February. The slow but steady increase of orders from the general industrial field is reassuring to builders who are counting upon business from that source.

The Louisville & Nashville Railroad bought three 36-in. x 17-ft. engine lathes from the Niles-Bement-Pond Co. and is expected to close for several smaller lathes the coming week. The latter also booked a 90-in. locomotive axle journal turning lathe for the Depew, N. Y., shops of the New York Central, a heavy 90-in. driving wheel lathe for the Great Northern Railroad, St. Paul, and a 48-in., 400-ton double wheel press for the Canadian National Railways. The Chicago, Milwaukee & St. Paul purchased an engine lathe locally and will buy three more machines. The John Steptoe Co. sold a milling machine in Louisville and a 14-in. motor-driven shaper in Dallas, Tex. It has been announced that the Packard Motor Car Co. bought seven lathes from a local builder two weeks ago. The Miehle Printing Press & Mfg. Co., Chicago, closed for a 30-in. radial drill, while the Newark Gear Cutting Machine Co., Newark, N. J., purchased a 4-ft. radial drill. The Great Northern Paper Co., Millinocket, Me., bought a 125-lb. Bradley compact hammer, and the Tennessee Coal, Iron & Railroad Co. took a Long & Allstatter tie plate punch. The Allegheny County Steam Heating Co., Pittsburgh, bought a 26-in. motor-driven shaper. A local builder received an order from an automobile maker for two upright drills. A Cincinnati manufacturer of boring mills booked large single machines for an elevator manufacturer, a rolling mill machinery concern and a rubber tire molder. William Rose & Brothers, Sharon Hill, Pa., purchased a 22-in. Aurora drill.

Used machinery is in good demand and is bringing high prices. Among recent sales are a 30-in. lathe to a Pittsburgh company and a 12-ft. x 10-ft. x 35-ft. planer to the Farrel Foundry & Machine Co., Ansonia, Conn.

The Burkett Closed Body Co., manufacturer of bus bodies, Dayton, Ohio, has purchased a three-story building formerly occupied by a unit of the Davis Sewing Machine Co. Expansion of business made the change necessary.

The London Motor Plow Co., Springfield, Ohio, manufacturer of motor plow attachments, has been reorganized as

the London Motor Plow Power Lift Co., and will resume production immediately. R. W. Johnston, Columbus, Ohio, is head of the company.

The Fenton Foundry Supply Co., Dayton, has purchased property at Gilbert and Masters Streets, formerly a part of the Davis Sewing Machine Co.'s plant. It includes two one-story buildings and five acres of land.

The Eugene Berninghaus Co., 1904 Western Avenue, Cincinnati, manufacturer of enameled iron products, has tentative plans for a three-story addition, 50 x 105 ft., to cost \$75,000 with equipment. J. M. Schmidt is vice-president. It is expected to begin work in the spring.

The Aetna Paper Co., Dayton, Ohio, has acquired property on Franklin Avenue and plans extensions in its mills to cost about \$1,000,000 with machinery. Maxwell Howard is president.

E. W. Cooper, 509 Deaderick Street, Nashville, Tenn., engineer, has inquiries out for a complete sand and gravel plant, including locomotive type crane, stiff-leg derrick with clamshell bucket, sand and gravel washer, one dredge for river service, several barges, and other equipment.

The Chattanooga Stamping & Enameling Co., Chattanooga, Tenn., has awarded a general contract to T. S. Moudy & Co., Chamberlain Building, for two one-story additions, one of which will be equipped as a pickling department. The structures are estimated to cost \$90,000 with machinery. The company recently increased its capital from \$200,000 to \$300,000 for expansion. Manker Patten is president.

The J. F. Wagner's Sons Co., 1147 South Seventh Street, Louisville, recently organized with a capital of \$75,000, will operate a plant for the manufacture of copper and galvanized iron cornices and kindred metal work. Theodore Wagner is president.

Detroit

DETROIT, Dec. 28.

WORK will soon begin on a two-story addition to the plant of the Wise Industries, Inc., 1033 Mount Elliott Avenue, Detroit, manufacturer of plated metal products, for which a general contract has been let to the Kreighoff Co., 4815 Bellevue Avenue. It will be two-stories, 50 x 100 ft., to cost \$50,000 with equipment.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has awarded a general contract to the Paul A. Mastenbrook Co., local, for a three-story addition to plant No. 3, estimated to cost \$80,000 with machinery.

Herbert G. Manley, Jackson, Mich., and associates have purchased the local plant of the Jackson Motor Car Co., bankrupt, assuming the debts of the company. It is said that plans for reorganization are in progress with proposed resumption of operations in the near future.

The Board of Education, Flushing, Mich., is considering the installation of manual training equipment in its proposed two-story high school, to cost \$150,000, for which plans are being prepared by the Warren, Holmes & Powers Co., Tussing Building, Lansing, Mich., architects. Bids will be asked on a general contract in the near future.

St. Louis

ST. LOUIS, Dec. 28

WORK will begin on a one-story foundry addition at the plant of the Service Brass Co., 331 North Mosley Street, Wichita, Kan., 50 x 70 ft., for which a general contract has been awarded to Walter C. Ramsey, 808 Litchfield Street.

The Norman Milling Co., Norman, Okla., is completing arrangements for a one-story addition to its ice-manufacturing plant to cost \$50,000.

The Blue Diamond Glass Co., Bristow, Okla., recently organized by C. A. Rogers, 1437 Troost Street, Tulsa, Okla., and associates, is contemplating the construction of a local plant for the manufacture of glass specialties, to cost \$55,000 with machinery.

The Independent Oil & Gas Co., Okmulgee, Okla., has plans under way for an addition to its oil refinery, including a one-story extension for the production of lubricating oils, etc., to cost \$400,000 with machinery. L. F. Silsbee is engineer.

The Economy Electrical Mfg. Co., Kansas City, Mo., has leased a building at Fourteenth Street and Agnes Avenue, and will remodel for a new plant. It is expected to begin operations soon. R. A. Dyer heads the company.

The Oklahoma Natural Gas Co., 117 West Fourth Street, Tulsa, Okla., is said to have plans for a new gas compressor station at Haskell, Okla., to cost \$70,000 with equipment.

The Southern Cotton Oil Co., Edmond, Okla., is reported to be contemplating rebuilding the portion of its plant recently destroyed by fire, with loss estimated at \$100,000 including machinery.

The Peoples' Ice & Storage Co., 1224 Chicago Avenue, Omaha, Neb., will proceed with the construction of an addition to its plant for considerable increase in output, including improvements in the present building, estimated to cost \$100,000 with machinery. Barnard T. Weisnall, Cincinnati, Ohio, is architect.

The Vantage Mining Co., Joplin, Mo., will proceed with the construction of a new mill in the Kane district, for lead production, to be known as plant No. 4, to cost close to \$100,000 with machinery. O. A. Sneed is one of the heads of the company.

L. O. Willis, architect, 207 Lathrop Building, Kansas City, Mo., has plans for a two-story addition to the automobile service, repair and garage building at 4528 Main Street, 80 x 280 ft., to cost \$85,000.

Philadelphia

PHILADELPHIA, Dec. 28.

BIDS are being asked on a general contract until Jan. 5 by the Board of Education, Keystone Building, Philadelphia, for its proposed three-story industrial school on Spring Garden Street, West of Thirteenth Street, comprising remodeling of an existing school building. A list of equipment to be installed will soon be arranged. Irwin T. Catherine is architect for the board.

The State Paper Box Co., Third and Cumberland Streets, Philadelphia, has leased a portion of the building at 1027-29 North Front Street, for an addition.

Fire, Dec. 23, destroyed a portion of the plant of the Bisbee Linseed Co., Drexel Building, Philadelphia, at South Philadelphia, with loss reported at \$200,000 including machinery. It is planned to rebuild.

The American Radiator Co., 40 West Fortieth Street, New York, has preliminary plans under way for the erection of several buildings at the former shipyard of the Fusey & Jones Co., Gloucester, N. J., recently acquired. It is expected to begin work in the spring. Other structures will be remodeled and new equipment installed. It is expected to give employment to about 1500 operatives.

Plans are under way for a reorganization of the New Hope Brick Co., New Hope, Pa., now in receivership, with the raising of a fund of about \$100,000 for extensions and improvements, including the installation of additional kilns. Ives Harvey is president.

The School Board of Cheltenham Township, Elkins Park, Pa., Charles Bond, care of the Charles Bond Co., 617 Arch Street, Philadelphia, president, plans the installation of manual training equipment in its proposed three-story and basement high school addition to cost \$650,000, for which superstructure will soon begin. Paul A. Davis, 3d, & Dunlap, 1713 Sansom Street, Philadelphia, is architect.

The O. K. Clutch & Machinery Co., East Columbia, Pa., manufacturer of friction clutches, gasoline hoists, etc., has awarded a general contract to the Austin Co., Philadelphia, for a one-story addition, 70 x 140 ft., to cost \$35,000.

The Philadelphia Suburban Water Co., 1612 Market Street, Philadelphia, has arranged a construction and improvement program for 1926 to cost approximately \$3,000,000 including the construction of a new pumping plant on Pickering Creek, installation of filtration equipment, pipe lines, etc. Clarence H. Geist is president.

E. R. Bitting, Allentown, Pa., architect, has plans for the construction of a three-story automobile service, repair and garage building at Seventh and Union Streets, on site 150 x 260 ft., to accommodate 300 cars at one time, estimated to cost \$115,000.

The Honesdale Radio Corporation, Honesdale, Pa., recently organized with a capital of \$25,000 by L. A. Dorfman, vice-president and general manager of the Rova Radio Corporation, 119 West Nineteenth Street, New York, and associates, is said to be planning the establishment of a new factory for the manufacture of radio equipment and parts.

The Pottsville Paper Box Co., Pottsville, Pa., recently formed by W. J. Blever and associates, has acquired the local paper box factory of Robert R. Morrison, and will take immediate possession. Plans are under way for extensions and improvements, including the installation of additional equipment.

Samuel Feldman, 27 South State Street, Wilkes-Barre, Pa., and associates, have taken bids on a general contract for a two-story automobile service, repair and garage building, 100 x 130 ft., to cost \$75,000.

Buffalo

BUFFALO, Dec. 28.

BIIDS will be asked in January by the Pennsylvania Railroad Co., Philadelphia, for the construction of the proposed addition to its shops at Olean, N. Y., to be one-story, 110 x 175 ft., to cost \$215,000.

The Malone Light & Power Co., Malone, N. Y., has arranged for a bond issue of \$737,500, a portion of the proceeds to be used for extensions and improvements in plant and system.

The Buffalo Body Corporation, 824 Seneca Street, Buffalo, is arranging for the erection of a two-story plant, 70 x 100 ft., to replace a portion of its works recently destroyed by fire with loss reported at \$150,000, including equipment. Kenneth B. MacDonald is president.

John P. Jaeckel, city manager, Auburn, N. Y., is asking bids until Jan. 16 for pumping machinery for the municipal waterworks, including one motor-driven centrifugal pumping unit, 7,000,000-gal. capacity per day; one similar type pump, 5,000,000-gal capacity per day; two primer pumps with d.c. motors, and one 175-hp. gasoline engine. Arthur J. Adams is chief engineer and superintendent of the water department.

The Marsh Valve Co., West Fourth Street, Dunkirk, N. Y., is said to have preliminary plans for a one-story addition, to cost \$25,000. W. C. Marsh is president.

The Board of Education, Union Free School District No. 1, Oakfield, N. Y., is considering the installation of manual training equipment in its proposed two-story high and grade school to cost \$150,000, for which foundations will soon be laid. C. C. Ade, 104 East Avenue, Rochester, N. Y., is architect.

Cleveland

CLEVELAND, Dec. 28.

MACHINE tool business has continued good the past week, which is rather unusual for the holiday season, and dealers and manufacturers booked a very satisfactory volume of orders, mostly in single machines. There is also considerable new inquiry, and sales during December have exceeded expectations. The Mueller Metals Co., Port Huron, Mich., bought a die sinking machine the past week and the Mather Spring Co., Toledo, Ohio, purchased a 6-in. vertical shaper.

The National Iron & Wire Co., Cleveland, structural steel fabricator, has purchased the Cleveland plant of the E. W. Bliss Co., at St. Clair and East 22nd Street and the New York Central Railroad. It is a modern building containing 44,000 sq. ft. of floor space and occupies a 5½-acre site. The plant has not been operated by the Bliss company for some time.

The Cleveland Railroad Co., Cleveland, contemplates the erection of a bus garage, one-story and basement, about 200 x 300 ft. Joseph H. Alexander is general manager.

The American Can Co., Toledo, Ohio, has awarded contract to A. Bentley & Co., Toledo, for a one-story factory, 59 x 271 ft. Mills-Rhines-Bellman & Nordhoff, Toledo, are the architects.

The Seneca Wire & Mfg Co., Fostoria, Ohio, will shortly place contracts for a one-story factory, 160 x 375 ft. L. E. Kinn is president.

The city of Akron, Ohio, will take bids about Jan. 22 for a \$3,000,000 sewage disposal plant. W. F. Peters, Delaware building, Akron, is city service director, and Metcalf & Eddy, 14 Beacon Street, Boston, are the consulting engineers.

The Aetna Paper Co., Franklin, Ohio, contemplates remodeling its plant and the erection of additions. Maxwell Howard is president.

The Alpha Portland Cement Co., 140 South Dearborn Street, Chicago, Ill., will make various improvements in its plant at Ironton, Ohio, and install a waste heat power generator.

The Goodyear Tire & Rubber Co., Akron, is taking bids for two one-story additions, 100 x 260 ft. and 100 x 120 ft., respectively.

The Rex File Co., Newcomerstown, Ohio, will erect one-story additions, providing 2300 sq. ft. of floor space. Paul E. Heller is president.

The Buckeye Tube & Steel Works, Sandusky, Ohio, recently incorporated with a capital of \$15,000, has acquired a plant of the Dauch Mfg. Co., and will remodel and make extensions.

Sheet metal working and wood-working shops will be provided in the Wilson Jr. High School, Cleveland, for which bids have been taken. G. A. Gessel is clerk of the Board of Education.

New England

BOSTON, Dec. 28.

LOCL machine tool business was at a standstill the past week. The ending of the year brings varying net results among the Boston machinery houses. There are those who did less business than in 1924, some who just about broke even and still others who did a greater volume of business, but made a poorer showing on earnings. The greater proportion of firms just about broke even with 1924, which was on the whole an unprofitable year. Confidence is expressed everywhere for the first half of 1926, and it is generally expected that the railroads, large industrial plants and new manufacturing firms will purchase considerable equipment. Some machinery houses state they have sufficient verbal orders, which if closed will make January one of the most profitable months in years.

Purchases of small equipment in December were somewhat larger than normal. One of the largest small tool houses states December sales will equal those of November, and that November was the best previous month in 1925.

The General Electric Co., West Lynn, Mass., closed bids Dec. 26 for a molding machine foundation. It also contemplates the erection of a foundry addition, and bids close Dec. 29 for a one-story, 28 x 70 ft. galvanizing plant. Plans are private.

The city of Boston has under consideration a new printing plant at Battery, Commercial and Salutation Streets, which will have a small repair shop.

Plans will be ready about Jan. 15 for a one-story, 43 x 56 x 35 ft. power plant at Rowe, Mass., for the New England Power Co., 35 Harvard Street, Worcester, Mass.

William F. Lacey & Sons, Mystic Avenue, Medford, Mass., automobile bodies have awarded contract for the erection of a new plant. Eli Porter, 30 Mystic Avenue, is the architect.

J. G. Turnbull Co., Greenfield, Mass., ice cream, has awarded a contract for a plant for which motors, conveying and other equipment is required. S. Alton Clark, Naugatuck, Conn., is the architect.

Preliminary estimates will shortly be taken by Little & Russell, 20 Newbury Street, Boston, architects on a proposed fire alarm signal station on Washington Street, Brookline, to contain a small machine shop.

Fire last week destroyed the boiler room and did considerable damage to the machine shop of Pierce & Cheshire, 32 Savage Streets, Gardner, Mass. Repairs and replacements will be made soon.

The Draper Corporation, Hopedale, Mass., manufacturer of textile machinery, will begin the erection of a new plant near Plymouth, Beebe River section, N. H., estimated to cost \$450,000 with equipment. It will be equipped primarily for the manufacture of bobbins.

The International Coal Corporation, Portland, Me., plans the construction of a new coal-handling plant to cost \$700,000 with machinery.

C. F. Springall, 50 Concord Street, Boston, architect, has completed plans for a two-story automobile service, repair and garage building, 110 x 220 ft., at 11-13 Charles Street, to cost \$110,000 with equipment.

The Connecticut Electric Service Co., Waterbury, Conn., has arranged for a preferred stock issue of \$5,625,000, a portion of the proceeds to be used for extensions and improvements in plant and system. Randal Morgan is president.

The Standard Steel & Iron Co., Southington, Conn., will begin operations at the former local plant of the Aetna Nut Co. for the production of steel bars and kindred specialties. The plant has been idle for some time past. A second mill will be started later, following improvements for the new line of production. It is purposed to give employment to about 85.

Julian D'Este, 10 Spice Street, Boston, has filed plans for a one-story foundry to cost about \$30,000.

The Merrimac Chemical Co., 148 State Street, Boston, has plans for a one-story addition to its plant at Everett, Mass., to be equipped as a cooperage shop, estimated to cost \$45,000.

The Crane Market

BUT little business has been placed in the past week and few new inquiries are reported as the year comes to a close. There is, however, considerable business in prospect for the early part of the new year, some of which is already in the form of formal inquiry. Pending orders include the 30-ton and 20-ton overhead cranes of the New York, New Haven & Hartford Railroad for Van Ness station, New York; one 10-ton pillar crane for the Delaware, Lackawanna & Western, for erection at Buffalo; a 100-ton, 60-ton and 30-ton electric cranes and a 10-ton hand power crane for the Phoenix Utility Co., 71 Broadway, New York, and several inquiries for single pieces of equipment. The Richmond Radiator Co., Uniontown, Pa., is inquiring for a 5-ton, 56-ft. span, magnet handling crane.

Among recent purchases are:

M. Gilinsky & Co., Trenton, N. J., a 25-ton locomotive crane from the Browning Crane Co.

S. Michelovitz, Harrisburg, Pa., a 25-ton locomotive crane from the Browning Crane Co.

Norfolk & Western Railroad, Roanoke, Va., a 10-ton, 31-ft. span electric overhead crane from the Northern Engineering Works.

Sanderson & Porter, engineers, New York, 8 fixed and 3 movable tainter gate hoists for the West Virginia Power & Transmission Co., from the Warsaw Iron Works.

Belladonna Brothers, 401 West 218th Street, New York, two 1-ton, 2 motor, double I-beam cranes with electric hoists, from the Bacon Co., New York.

Duratex Co., Newark, N. J., a 1-ton, 1-motor crane from the New Jersey Foundry & Machine Co.

Maytag Corporation, Newton, Iowa, an electric overhead crane for a new foundry, from the Shaw Electric Crane Co.

Koppers Co., Chicago, a 7½-ton hand power crane for the Inland Steel Co., Indiana Harbor plant, from the Whiting Corporation.

Fire, Dec. 19, destroyed a portion of the plant of the Sweet Paper Box Co., Norton, Mass., with loss estimated at \$50,000 including equipment. It is planned to rebuild immediately.

The Central Vermont Railway Co., Brattleboro, Vt., has preliminary plans for a one-story machine and locomotive repair shop at its local yards, estimated to cost \$25,000. P. D. Fitzpatrick, St. Albans, Vt., is chief engineer.

The Crompton & Knowles Loom Works, Inc., Worcester, Mass., has awarded a general contract to John J. Powers, 15 Ashland Street, for a new five-story building to cost approximately \$50,000.

The Kilborn-Sauer Co., Fairfield, Conn., manufacturer of automobile lamps, has tentative plans for the rebuilding of the portion of its factory destroyed by fire Dec. 19.

fill and in addition many inquiries indicate even greater activity after Jan. 1. Scarcity of skilled machinists is becoming a handicap to production. The pressure is such that plants which ordinarily close from Dec. 24 to Jan. 2 were idle only over Dec. 26 and will only close again over Jan. 2.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., which recently placed contracts for the construction of an addition to its main works at Manitowoc, will also enlarge its branch plant at Two Rivers, Wis., by a four-story addition, 60x95 ft., and a one-story extension, 50 x 100 ft. The engineers are Lockwood, Greene & Co., Chicago, and the general contractor is W. W. Oeflein, Inc., 86 Michigan Street, Milwaukee. George Vits is president and general manager.

The Racine, Wis., Water Commission has approved plans by Alvord, Burdick & Howson, consulting engineers, Chicago, and is ready to ask bids for the construction and equipment of a new filtration plant unit of the municipal water works, to cost about \$100,000. Work will start about March 15 or April 1. F. M. McElroy is superintendent.

The Conway Co., 2019-2025 St. Paul Avenue, Milwaukee, manufacturer of cabinets, millwork, doors, etc., expects to begin work immediately on the replacement of its plant, destroyed by fire on Dec. 21 with a loss estimated at \$250,000. The new factory will be 190 x 210 ft., part two and three stories, and will require practically a full complement of new machinery, motors, conveyors, dust collectors, etc. W. J. Conway is president.

The Simple Snap Curtain Fastener Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture metal specialties, principally a device for automobile curtains and similar goods. Plans for production are being arranged. The principals are represented by August C. Moeller, attorney, 105 Wells Street, Milwaukee.

The Combined Locks, Wis., Paper Co. has let the general contract to the C. R. Meyer & Sons Co., Oshkosh, Wis., for a two-story paper finishing building, 100 x 175 ft., costing about \$125,000 complete.

The Badger Radio Co., 480 Market Street, Milwaukee, has amended its corporate articles to include the manufacture of boilers, electric and hydraulic pumps and hoisting machinery. The authorized capitalization is also increased from \$25,000 to \$85,000.

The Walsh Packing & Storage Co., 741 Fourth Street, Milwaukee, will build a one-story garage and service building, 50 x 120 ft., at 1504 Holton Street, at a cost of about \$38,000. M. A. Becker, 221 Grand Avenue, is architect and engineer.

Pacific Coast

SAN FRANCISCO, Dec. 24.

PLANS have been authorized by the San Joaquin Light & Power Corporation, Fresno, Cal., for a new steam-operated electric power plant near Merced, Cal., to cost approximately \$500,000. Additions and improvements will be made in the steel tower transmission line in this district to cost \$200,000.

Bids have been asked by the Electric Storage Battery Co., 1536 Bush Street, San Francisco, for its proposed one and two-story plant to cost \$125,000. H. H. Meyers, Kohl Building, is architect. Headquarters of the company are at Nineteenth and Allegheny Streets, Philadelphia.

Milwaukee

MILWAUKEE, Dec. 28.

WITH the largest volume of orders on the books at the close of any year in the last four, local machine tool builders are entering the new year with optimism. A number of shops have orders which will require five to six months to

The Provo Ice & Cold Storage Co., 204 Mining Exchange Building, Colorado Springs, Colo., is planning the construction of a one-story ice-manufacturing plant at Provo, Utah, early next year, to cost \$75,000 with machinery. E. J. Ullrich is general manager.

The Old Mission Portland Cement Co., Standard Oil Building, San Francisco, is arranging an expansion and improvement program in its mills at San Juan Bautista, Cal., in 1926, including new buildings and machinery estimated to cost \$750,000.

The Calveras Cooper Co., Copperopolis, Cal., has tentative plans under consideration for a new refinery on the waterfront at Stockton, Cal., to cost about \$400,000 with machinery. It is also proposed to build a one-story mill unit for wire-drawing service at this location.

Robert Young, 1713 North Prospect Street, Tacoma, Wash., engineer, has tentative plans for a proposed hydroelectric power project on the Cle Elum River, Kittitas County, reported to cost \$200,000.

The Pacific Coast Forge Co., 3800 Iowa Street, Seattle, manufacturer of spikes, bolts, etc., is having plans drawn by the Austin Co., Dexter-Horton Building, for a one-story addition to cost \$30,000.

South Atlantic States

BALTIMORE, Dec. 28.

THIS MUNSON BATTERY SERVICE CO., 126 Richmond Street, Baltimore, has acquired adjoining property, 76 x 151 ft., for extensions. Existing buildings will be remodeled and equipment installed.

J. B. Greer, 1627 Princess Avenue, Pittsburgh, is negotiating with the City Council at Frostburg, Md., for a site for a proposed glass manufacturing plant for the production of hollowware specialties to cost \$65,000, of which about \$45,000 will be expended for machinery.

The Capital Garage Co., 1416 H Street, N.W., Washington, is considering the construction of a ten-story service, repair and garage building at 1312-18 New York Avenue, N.W., 150 x 210 ft., to cost \$800,000 with equipment. R. C. Jones is president.

The Carter Production Works, P. O. Box 1911, Wilmington, N. C., is in the market for equipment for the manufacture of light metal flues and stacks.

The Square Deal Transfer Co., 117 East Church Street, Roanoke, Va., has inquiries out for sand conveying and handling equipment.

Fire, Dec. 19, destroyed a portion of the plant of the Winchester & Woods Co., 220 North Holliday Street, Baltimore, manufacturer of toy watches, watch mechanisms, etc. An official estimate of loss has not been announced. It is planned to rebuild.

The Pekor Iron Works, Inc., Ninth Street, Columbus, Ga., has begun work for enlargements in its plant to double the present capacity, estimated to cost \$25,000.

A. E. Fitkin & Co., 165 Broadway, New York, operating electric light and power properties, have acquired the Exmore Light & Power Co., operating at Onancock, Va., and vicinity, and contemplate extensions. It is proposed to treble the capacity of the present steam-operated electric power plant at a cost of \$250,000, including equipment, with extensions in transmission system.

The Stem Ginning Co., Oxford, N. C., W. L. Peace, general manager, is planning to purchase a 60-hp. steam engine and accessories; also 60-hp. oil engine and cotton-ginning machinery, including automatic trumper, 75-saw gin and baling machinery.

The Simmons Co., Kenosha, Wis., is completing plans for a new factory on Jones Avenue, Atlanta, Ga., for the manufacture of metal beds, springs, etc., totaling about 60,000 sq. ft. of floor space. Two main units will be built to cost \$400,000 with equipment. Morgan & Dillon, Grant Building, Atlanta, are engineers.

The Triangle Mfg. Co., High Point, N. C., has plans for a new one-story factory, 50 x 90 ft., for the manufacture of piano benches and kindred products. Woodworking and other machinery will soon be purchased.

The Newman Machine Co., Jackson Street, Greensboro, N. C., has inquiries out for an internal grinder, about 10 to 12 in. inside diameter.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a locomotive-type boiler, 25 to 30-hp. capacity; also for dragline equipment, 100 ft. boom, mounted on skids or rollers, steam or electric-operated, with 3 yd. bucket capacity.

The Southern Railway System, 1300 Pennsylvania Avenue, Washington, is said to have plans nearing completion

for rebuilding its coach shops at Knoxville, Tenn., recently partially destroyed by fire, with the installation of additional machinery, to cost \$150,000.

The Givens Refrigerator Co., Wynne-Claughton Building, Atlanta, Ga., manufacturer of refrigerators, has leased a local building for expansion and will soon install equipment to develop an output of 500 refrigerators per month. W. S. Smith is secretary.

The Southern Power Co. Charlotte, N. C., will push construction on its new steam-operated electric power plant at Dukeville, near Spencer, N. C., on the Yadkin River, to develop an initial capacity of 100,000 hp., estimated to cost close to \$1,000,000 with transmission system.

The City Council, Four Oaks, N. C., plans the installation of pumping machinery in connection with extensions in the municipal waterworks to cost \$70,000. The J. B. McCrary Co., Atlanta, Ga., are engineers.

The Buck Ice & Coal Co., 2400 Twelfth Avenue, Columbus, Ga., will make extensions and improvements in its ice-manufacturing plant to double the present capacity to cost \$45,000 with machinery.

Gulf States

BIRMINGHAM, Dec. 28.

ABOUT 1275 acres of limestone properties in the vicinity of Ocala, Fla., has been acquired by the Lehigh Portland Cement Co., Allentown, Pa., for a new mill, making the twenty-first such plant to be operated by the company. It will consist of several units and cost close to \$1,000,000. A machine shop and power house will be built.

The Independent Ice Co., Highland Avenue, Montgomery, Ala., will erect a new ice-manufacturing plant, to be known as factory No. 2, estimated to cost \$175,000 with machinery.

The Phillips Petroleum Co., Bartlesville, Okla., has acquired the gasoline refinery of the American Gasoline Co., Panhandle field, near Amarillo, Tex., for \$300,000. The new owner is said to have plans for extensions and improvements, including the installation of additional equipment, and is also reported to be contemplating the construction of another gasoline extraction plant in the South Hutchinson, Tex., oilfields.

Fire, Dec. 20, destroyed a portion of the planing mill and woodworking plant of the Weaver Brothers & Looney Lumber Co., Couchwood, near Shreveport, La., with loss estimated at \$100,000 including machinery. Plans for rebuilding are under consideration.

The Wilkes-Jones Mfg. Co., 1702 Swift Street, Jacksonville, Fla., is desirous of getting in touch with a wire works or metal-working plant in position to contract for the manufacture of a patented screen hinge in quantity.

The Cuero Light & Power Co., Cuero, Tex., will make extensions in the local ice-manufacturing plant of the Cuero Ice & Bottling Co., and install electric-operated equipment.

The City Commission, Bryan, Tex., will proceed with extensions in the municipal electric power plant, including the installation of a new generating unit and auxiliary machinery with capacity of 550 kw.

The Celotex Co., 645 North Michigan Boulevard, Chicago, manufacturer of cane fiber wallboard products, etc., has acquired property in the vicinity of its mill at Marrero, La., and has plans under way for a new unit estimated to cost \$1,500,000. To provide funds for the expansion, the company has disposed of a stock issue of \$2,000,000. C. F. Dahlberg is vice-president.

J. W. Malone, 182 N. E. Forty-fifth Street, Miami, Fla., is planning to purchase a quantity of machinery for the manufacture of drain tile in 4-in. sizes and larger, to be installed in a local building.

The Southern Utilities Co., Palatka, Fla., is said to be arranging a fund of \$1,500,000 for extensions and improvements in its power plant and system in the vicinity of Fort Myers, Fla., during 1926, including the installation of considerable additional equipment.

The Lyons Fertilizer Co., Tampa, Fla., has plans for a new one-story works at Thirty-fifth Street and Fourth Avenue, to cost \$100,000 with machinery. It is understood that contract for building has been let to the Austin Co., Cleveland.

The Santa Rose Portland Cement Co., St. Stevens, Ala., has placed contract with the H. K. Ferguson Co., Cleveland, for a \$2,250,000 plant. The equipment, including conveyors, grinding machines and substation equipment, will be purchased by the Ferguson company. The contract also includes warehouses to be built at Mobile, New Orleans and Tampa.

The King Co., with plants at St. Joseph, Mo., and Chicago, will erect a shop in Sheffield, Ala., for the manufacture of white-way standards. About 200 men will be employed and approximately 50 tons of iron will be melted daily.

NEW TRADE PUBLICATIONS

Ball Bearing Applications.—New Departure Mfg. Co., Bristol, Conn. Folder giving figures lessened maintenance cost of ball-bearing as compared to non-ball-bearing electric motors.

Ball Bearings in Machine Tools.—Fafnir Bearing Co., New Britain, Conn. Vol. VIII No. 5 of the *Dragon*, a monthly publication of the Fafnir company, describes and illustrates the use of ball bearings in gear shaper, lathes, grinders, milling machines and drill presses.

Balancing Machine.—Gisholt Machine Co., Madison, Wis. Booklet describing the company's precision balancing machine, which measures the amount of unbalance and indicates the point for correction. Illustrations picture some applications of the machine, and some users of the machines are listed.

Hack Saw Blades.—Simonds Saw & Steel Co., Fitchburg, Mass. Booklet of 24 pages under title of "Hacksaw-ology," giving information on the use and care of hack saw blades.

Die-Heads.—Ideal Tool & Mfg. Co., Beaver Falls, Pa. Booklet describing self-opening and adjustable screw-cutting die-heads. Construction details are illustrated and specifications of the various types and sizes given.

Bolts, Nuts and Bars.—Milton Mfg. Co., Milton, Pa. Catalog No. 29, 99 pages, 5 1/4 x 7 1/2 in. thumb indexed. List prices are given on a large variety of types and sizes of nuts and bolts, and on tie rods, rivets and washers. A section is devoted to iron and steel bars manufactured by the company, standard classifications of extras being included. Other sections contain useful information, a telegraph code and index.

Small Tools.—Greenfield Tap & Die Corporation, Greenfield, Mass. Catalog No. 49, 383 pages, 5 x 7 1/4 in., thumb indexed, listing a comprehensive assortment of screw plates, taps, dies, twist drills, reamers, screw slotting cutters, gages, pipe tools, bolt and pipe threading machines and other equipment. The complete line of the company's screw plates is listed, with the exception of those containing metric threads, which are in a separate supplement. The recently adopted method of packing screw plates for the domestic market is of interest. For reshipping purposes, popular assortments are packed in corrugated cartons for parcel post, express or freight shipment. The screw plates in the cartons can be put in stock, and for reshipment an ordinary label may be pasted on the container. Ground thread taps and spiral fluted staybolt taps are listed in the catalog, and the company's complete line of gages, bolt and pipe threading machines included for the first time. The material in the catalog is conveniently grouped, briefly described and illustrated, and sizes and list prices given. A section is devoted to dimensions and tolerances of taps, thread dimensions and a great deal of other useful information.

Wire Drawing Block.—Vaughn Machinery Co., Cuyahoga Falls, Ohio. Attractive 20-page catalog featuring the Motobloc unit for which speed, smoothness and flexibility are claimed. This is a motor-driven drawing block suitable for any number of reductions. The machine was described and illustrated at page 1645 of THE IRON AGE for June 4, 1925.

Mechanical Drive Turbine.—General Electric Co., Schenectady. Four-page folder illustrating type D-54 turbine for driving centrifugal pumps, blowers and other units. It is made condensing or non-condensing, up to 400 hp., and operating at 1200 to 4000 r.p.m.

Heat Transfer Equipment.—The Griscom-Russell Co., 90 West Street, New York. A quick reference folder which briefly describes condensers, heat exchangers, gas and water coolers, evaporators, oil heaters, etc.

Pebble Mills.—Patterson Foundry & Machine Co., East Liverpool, Ohio. Bulletin, "For the Chemist," 6 pages describing with illustrations various types for use of chemists, metallurgists, etc.

Metal Working Lubricants.—D. A. Stuart & Co., Inc., 2727 South Troy Street, Chicago. A 20-page pamphlet describing various oils and greases for cutting, quenching and tempering.

Monel Metal.—International Nickel Co., 67 Wall Street, New York. The "Monel Metal and Nickel Buyers' Guide," a 14-page pamphlet, lists the manufacturers from whom various products can be obtained.

Pyrometers.—Wilson-Maculen Co., Inc., 333 Concord Avenue, New York. Describes the automatic electric compensator for pyrometer cold junctions, the latest improvement in that company's pyrometers.

Air Washers.—American Blower Co., Detroit. Bulletin 1923 describes Sirocco air washers for use in large buildings. Details are given careful attention, sections being shown of nozzles and other parts, while diagrams and tables give data necessary for specifying.

Water Level Gages.—Bristol Co., Waterbury, Conn. Bulletin 339 of 12 pages describes Bristol-Derr water level gages for steam boilers. They are made for both indicating and recording and may be located at points distant from the boiler. Easy accessibility for reading is one of the features.

Refractory Material.—Walton Products Co., Fox Building, Philadelphia. Eight-page booklet outlining the savings resulting from the use of Waldak refractory plaster in permitting the utilization of waste fire brick for furnace repairs. Firebrick usually thrown away, may be ground and mixed with fire clay and Waldak, and used in making refractory mortar, plastic firebrick or refractory plaster. The cost of the refractory mortar or cement made in this manner is claimed to be less than \$6 a ton. Especially stressed is the use of Waldak plaster in new and old construction as a coating $\frac{1}{4}$ to $\frac{1}{2}$ in. thick. The material is made up of several binding ingredients which are said to give positive bond at room temperatures and a sequence of bonds at higher temperatures until the vitrification point of the clay used with it is reached.

Aerial Tramways.—A. Leschen & Sons Rope Co., 5909 Kennerly Avenue, St. Louis. Catalog No. T25 containing 52 pages of text and illustrations devoted to the Leschen system for aerial transportation of material.

Calendar.—Youngstown Sheet & Tube Co., Youngstown, Ohio. Calendar for 1926, 19 x 24 in. in size, with 12 colored illustrations of processes in the manufacture of iron and steel, will be sent to any address on receipt of 10 cents to cover cost of wrapping and mailing. Requests should be addressed to the Publicity Department.

Blue Printing Equipment.—Paragon Machine Co., Rochester, N. Y. Attractive booklet of 24 pages describing the company's methods and machines employed in printing, developing and washing and drying blue prints. There are numerous illustrations, both photo engravings and line sketches, and a section is devoted to accessory equipment. An efficient arrangement of a blue print room is also shown.

Saw Making.—Henry Disston & Sons, Philadelphia. Twelve booklet pages telling how "Each separate brand of saws is made from a lot of steel possessing its own distinctive quality, and this steel retains its identity throughout the entire manufacturing process." The reader is taken through the various processes of rolling, trimming blanks, cutting teeth, hardening, tempering, smiting, grinding, tensioning, finishing and sharpening.

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Current Metal Prices

On Small Lots, Delivered from Stocks, New York

THESSE prices are given for the convenience of small-lot buyers whose requirements do not run into mill-size orders.

Only base prices can be listed in some cases, due to limits of space; other items of a given group are deducible from the base price.

The prices which are quoted below are those at which small lots may be bought, whether from jobbers' or other stocks.

Complete market reports and prices on large shipments from mills will be found elsewhere under "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates		Per Lb.
Bars:		
Refined iron bars, base price.....	3.24c.	
Swedish charcoal iron bars, base.....	7.00c. to 7.25c.	
Soft steel bars, base price.....	3.24c.	
Hoops, base price.....	4.49c.	
Bands, base price.....	3.99c.	
Beams and channels, angles and tees, 3 in. x 1/4 in. and larger, base.....	3.34c.	
Channels, angles and tees under 3 in. x 1/4 in. base.....	3.24c.	
Steel plates, 1/4 in. and heavier.....	3.34c.	

Merchant Steel		Per Lb.
Tire, 1 1/2 x 1/4 in. and larger.....	3.30c.	
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger).....	3.65c.	
Toe-calk, 1/2 x 1/8 in. and larger.....	4.20c.	
Cold-rolled strip, soft and quarter hard.....	6.25c.	
Open-hearth spring steel.....	4.50c. to 7.00c.	
Shafting and Screw Stock:		
Rounds and hex.....	4.00c. to 5.00c.	
Squares and flats.....	4.50c. to 5.50c.	
Standard tool steel, base price.....	12.00c.	
Extra tool steel.....	15.00c. to 18.00c.	
Special tool steel.....	20.00c. to 23.00c.	
High-speed steel, 18 per cent tungsten.....	70c.	

Sheets		Per Lb.
Blue Annealed		
No. 10	3.89c.	
No. 12	3.94c.	
No. 14	3.99c.	
No. 16	4.09c.	

Box Annealed—Black		Per Lb.
Soft Steel		
C. R. One Pass	Long Terne Sheets	
Per Lb.	Per Lb.	
Nos. 18 to 20	3.95c. to 4.10c.	5.75c.
Nos. 22 and 24	4.20c. to 4.35c.	5.90c.
No. 26	4.25c. to 4.40c.	6.05c.
No. 28*	4.35c. to 4.50c.	6.35c.
No. 30	4.55c. to 4.70c.	6.85c.

Galvanized		Per Lb.
No. 14	4.45c. to 4.60c.	
No. 16	4.60c. to 4.75c.	
Nos. 18 and 20	4.75c. to 4.90c.	
Nos. 22 and 24	4.90c. to 5.05c.	
No. 26	5.05c. to 5.20c.	
No. 28*	5.35c. to 5.50c.	
No. 30	5.85c. to 6.00c.	

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe		Per Lb.
Standard Steel		
Black Galv.	Black Galv.	
1/2 in. Butt....	46	29
5/8 in. Butt....	51	37
1-3 in. Butt....	58	39
2 1/2-6 in. Lap..	48	35
7 & 8 in. Lap..	44	17
11 & 12 in. Lap..	37	12
Bolts and Screws		
Machine bolts, cut thread, 40 and 10 per cent off list		
Carriage bolts, cut thread, 30 and 10 per cent off list		
Coach screws, 40 and 10 per cent off list		
Wood screws, flat head iron,		
80, 20, 10 and 5 per cent off list		
Steel Wire		
BASE PRICE† ON NO. 9 GAGE AND COARSER	Per Lb.	
Bright, basic	4.25c.	
Annealed, soft	4.50c.	
Galvanized, annealed	5.15c.	
Coppered, basic	5.15c.	
Tinned, soft Bessemer	6.15c.	

†Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire		BASE PRICE
High brass sheet		19 1/2c. to 20 1/2c.
High brass wire		19 1/2c. to 20 1/2c.
Brass rods		16 1/2c. to 17 1/2c.
Brass tube, brazed		27 1/2c. to 28 1/2c.
Brass tube, seamless		23 1/2c. to 24 1/2c.
Copper tube, seamless		24 1/2c. to 25 1/2c.

Copper Sheets

Sheet copper, hot rolled, 22 1/2c. to 23 1/2c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates		COKE—14x20	Primes	Seconds
Bright Tin	Grade "AAA"	Grade "A"	80 lb...	\$6.15
	Charcoal	Charcoal	90 lb...	6.30
	14x20	14x20	100 lb...	6.45
	IC.. \$11.25	\$8.85	IC..	6.65
	IX.. 12.85	10.85	IX..	7.85
	IXX.. 14.40	12.55	IXX..	9.00
	IXXX.. 15.75	13.85	IXXX..	10.35
	IXXXX.. 17.00	15.05	IXXXX..	11.35

Terne Plates		14 x 20	
IC—8-lb. coating			\$7.75 to \$8.00
IC—20-lb. coating			10.25 to 10.50
IC—30-lb. coating			12.00 to 12.50
IC—40-lb. coating			13.65 to 13.75
Fire-door stock			10.50

Tin		
Straits, pig		65c. to 65 1/2c.
Bar		69c. to 69 1/2c.

Copper		
Lake ingot		15 c.
Electrolytic		14 1/2c.
Casting		14 1/2c.

Spelter and Sheet Zinc		
Western spelter		9 1/2c. to 10c.
Sheet zinc, No. 9 base, casks		13 1/2c.; open, 13 1/2c.

Lead and Solder*		
American pig lead		10 1/2c. to 11 1/2c.
Bar lead		12 1/2c. to 13 1/2c.
Solder, 1/4 and 1/2 guaranteed		40c.
No. 1 solder		37c.
Refined solder		30 1/2c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal		
Best grade, per lb.		68c. to 72c.
Commercial grade, per lb.		30c. to 35c.

Antimony		
Asiatic		23 1/2c. to 24 1/2c.

Aluminum		
No. 1 aluminum (guaranteed over 99 per cent pure), ingots for remelting, per lb.		30 1/2c. to 31c.

Old Metals

Business is quiet but prices are firm. Dealers' buying prices are as follows:

		CENTS PER LB.
Copper, heavy crucible		12.00
Copper, heavy wire		11.75
Copper, light bottoms		9.50
Brass, heavy		7.25
Brass, light		6.25
Heavy machine composition		9.00
No. 1 yellow brass turnings		8.50
No. 1 red brass or composition turnings		8.00
Lead, heavy		7.75
Lead, tea		6.00
Zinc		5.25
Cast aluminum		20.00
Sheet aluminum		20.00

